LOAD FORECAST

Economics &
Forecasts Division
Power System Program Branch

No. 861208

ontario hydro

700 University Avenue, Toronto, Ontario M5G 1X6

Location: H5-C27
Telephone: (416) 592-3692

March 27, 1987
File No. 127.63

Dear Sir/Madam:

I am pleased to send you a copy of the latest issue of the Load Forecast Report produced by the Economics and Forecasts Division of Ontario Hydro.

Load Forecast Report 861208 contains the Long- and Short-Term Forecasts produced and approved in the calendar year 1986. The goal of the Long-Term Forecast is to provide information for system planning purposes, and as such covers a 20-year time horizon. The Short-Term Forecast, on the other hand, is focussed on the more immediate future and is used to plan revenue requirements, rates and budgets.

Both forecasts give projections of peak and energy demand.

If you have any questions regarding the methodologies or assumptions used, please contact me.

Yours truly,

C. MacKay-Lassonde

C. MacKay-Lassonde
Manager - Load Forecasts Department
Economics and Forecasts Division

Attach.

LOAD FORECASTS REPORT

NO. 861208

SYSTEM DEMANDS

Load Forecasts Department
Economics and Forecasts Division
Power System Program Branch

March 1987

File No.: 127

TABLE OF CONTENTS

		Page
INTRODUCTION		i
1.0	SHORT-TERM FORECAST -1986 TO 1991	1
1.1	Highlights	1
1.1.1	Short-Term Forecast	1
1.1.2	Comparison with Load Forecast 851209 - Peak Demand	2
1.1.3	Comparison to Load Forecasts 851209 - Energy Demand	3
1.1.4	Comparison of Primary to Basic Load Forecast: 861208	4
1.1.5	Regional Estimates	5
1.2	Commentary	6
1.2.1	Considerations Affecting the 1986 Short-Term Forecast	6
1.2.2	The Unallocated Load	8
1.2.3	Short-Term Forecasting Models	9
1.3	Losses	10
1.4	Capacity Interruptible Loads	10
1.5	Performance of Load Forecast No. 851209 to End of 1986	11
2.0	LONG TERM FORECAST - 1991 TO 2005	12
2.1	Highlights	12
2.1.1	Load Forecast 861208	12
2.1.2	Comparison with Load Forecast 851209 - Peak Demand	13
2.1.3	Comparison with Load Forecast 851209 - Energy Demand	14
2.1.4	Comparison of Load Forecast 851209 to Basic Load Forecast 861208	15
2.1.5	Forecast Uncertainty	16
2.2	Commentary	17
2.2.1	Methodology of the Long-Term Forecast	17
2.2.2	Discussion of Major Assumptions	18
2.2.3	Risks to the Forecast	20
2.3	Results of Forecasting Models	21
2.3.1	Economic and Demographic Energy Model - EDEM	21
2.3.2	End Use Forecasting Model Results	24
2.3.3	Recommended Forecast	31
2.3.4	Reasonableness Checks on the 1986 Recommended Forecast	32
2.4	Results for Alternative Scenarios	33
2.5	Impact of Ontario Hydro's Marketing Activities	35
2.5.1	Introduction	35
2.5.2	The Forecast	35
2.5.3	Policy Assumptions Embedded in the Forecast	36
2.5.4	Considerations for the Preparation of Future Primary Load Forecasts	37

TABLE OF CONTENTS (continued)

		Page
3.0	FORECAST PERFORMANCE	71
3.0.1	Forecasts Reviewed	71
3.0.2	Introduction to Forecast Performance Review	71
3.1	Tracking Load Forecast 861208 to 1986 Actuals	72
3.1.1	Primary Demands	72
3.1.2	Diversity and Losses	72
3.1.3	Unallocated Load	73
3.1.4	Detail of Customer Loads	73
4.0	UNCERTAINTY IN THE LOAD FORECAST	85
5.0	GLOSSARY	89
5.1	Demand (versus Load)	89
5.1.1	Basic Load Forecast	91
5.1.2	Primary Load Forecast	91
5.2	Diversity and Losses	91
5.3	Customers' Loads	92
5.3.1	Firm Loads	92
5.3.2	Capacity Interruptible Loads	92
5.4	Standby Power	93

INTRODUCTION

The Load Forecasts Department issues two load forecasts each year:

a Long-Term Forecast: Produced in the fall for system planning purposes, with emphasis on total system demand and a time horizon of approximately 20 years.

and

a Short-Term Forecast: Produced early summer for revenue planning, rate development and budget purposes.

This Load Forecast Report 861208 contains the two forecasts produced and approved in the calendar year 1986: the Short-Term Load Forecast approved by the Executive Office on September 15, 1986; and the Long-Term Forecast approved by the Board of Directors on December 8, 1986.

The Short-Term Load Forecast (1986-1991) is presented first. It is prepared by using the results of:

- A customer survey carried out in the spring (called Regional Estimates);
- Economic forecasts based on the latest trends and anticipated changes in the economic environment;
- Electricity demand forecast models relying on the most recent data;
- Analysis of the deviations of recent Ontario electricity demands from last year's predictions;
- Forecast of Indirect Incentives.

The Short-Term Primary Load Forecast highlights include a comparison of the Primary Load Forecast to last year's and this year's Basic Load Forecast with a discussion regarding Indirect Incentives, followed by a summary of customer's forecasts, or Regional Estimates. Also provided is a commentary on considerations affecting the forecast, such as the economic outlook, future electricity price levels, weather effects, and the amount of electricity attributed to unallocated load and transmission losses. All these factors contribute to the uncertainty associated with the forecast. This subject is covered in the section on the Long-Term Forecast. Analysis of the performance of last year's forecast, results of the short-term forecasting models we use and the forecast of capacity interruptible loads complete the section on the short-term forecast.

The Long-Term Load Forecast (1992-2005) was obtained through the integration of the following factors: (1) short-term results, (2) long-term economic outlook, (3) econometric modal (EDEM) results, (4) end-use model results, (5) 1985 Load Forecast, (6) judgemental factors, and (7) Indirect Incentives.

The presentation of the Long-Term Primary Load Forecast section is similar to the Short-Term. This section includes the results of two different approaches to forecasting, the econometric model - EDEM, and end-use models, as well as two approaches to establishing confidence intervals; statistical band of uncertainty based on historical forecast performance and alternative macroeconomic scenarios based on the EDEM model.

The Indirect Incentives referred to are programs initiated by Ontario Hydro designed to alter the level and shape of the load. This year, for the first time, the Short- and Long-Term Basic Load Forecasts were adjusted to include the effects of Indirect Incentives of total system demand. The resulting forecast is the Primary Load Forecast. All notation and tables presented in this report refer to the Primary Load Forecast unless the other (Basic) is explicitly noted. The Primary Load Forecast is to be used for planning purposes. It is forecasted that these incentives will reduce energy demand by 6.7 TW.h in the year 2005, resulting in a Primary Load Forecast of 182.8 TW.h, compared with the Basic level of 189.5 TW.h.

Supplementary reports are prepared which provide additional detail:

(a) individual customers monthly energy;

(b) customers' loads coincident with system peak demands;

(c) an aggregation of all types of load within areas projected to the year 2005.

These reports are not printed for wide distribution because they are of limited interest to most users of the report, and are available in machine-readable form for users who require the data.

1.0 SHORT-TERM FORECAST - 1986 to 1991

1.1 Highlights

The 1986 Short-Term Forecast is higher than the 1985 Short-Term Forecast in all forecast years. The addition to last year's forecast for December peaks is around 1100 MW or 5% for each of the six December peaks forecasted. The average annual rate of growth foreseen for the 1986-1991 period is approximately 3.4 TW.h or 2.6% for energy and just under 600 MW or 2.7% for the December peak.

The change in forecast reflects the above-forecast sales of 1985 and the first six months of 1986. Sales during the last quarter of 1985 and the first quarter of 1986 were above forecast levels by 3.2%, reflecting the unanticipated strong economic growth at that time. At the time this forecast was produced provincial gross domestic product was projected to reach 4.2% in 1986, compared to the previous year's forecast of a slowdown to only 1.5%.

The current forecast assumes that the levels of economic activity and electricity sales reached by the end of 1985 will form a base for continuing growth. Growth rates for the rest of this decade are also forecast to be slightly higher than previously forecast.

1.1.1 Short-Term Forecast

The 1986 Short-Term Primary Load Forecast for the total system is:

	Total System Demand								
	December 1-Hour Peak			Energy					
		Annual Growth				Annual Growth			
Year	MW	MW	%	Avg MW	TW.h	Avg MW	%	TW.h	%
Short Term									
1985 Actual	20393			13248	116.0				
1986	20610	217	1.1	13810	121.0	562	4.2	4.9	4.2
1987	21256	646	3.1	14274	125.0	464	3.4	4.1	3.4
1988	21962	706	3.3	14690	129.0*	416	2.9	4.0*	3.2*
1989	22451	489	2.2	15079	132.1	389	2.6	3.1	2.4
1990	23031	580	2.6	15413	135.0	334	2.2	2.9	2.2
1991	23564	533	2.3	15738	137.9	325	2.1	2.8	2.1
Avg Increase									
1985-1991		529	2.4			415	2.9	3.6	2.9
1986-1991		591	2.7			386	2.6	3.4	2.6

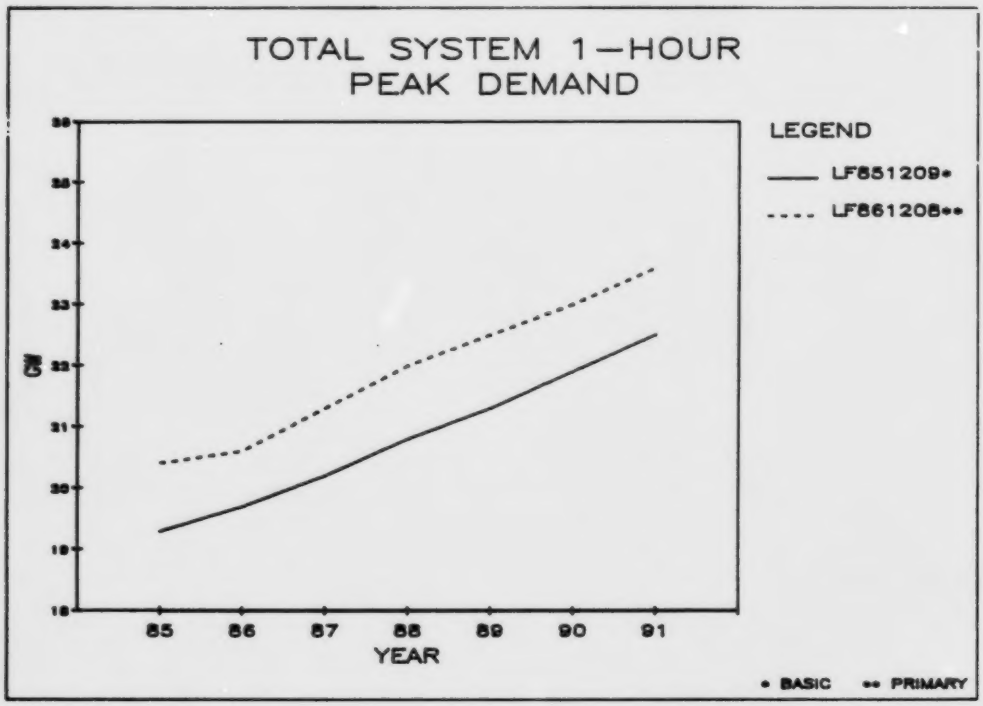
* Affected by Leap Year

1.1.2 Comparison with Load Forecast 851209 - Peak Demand

The level of the peak and energy forecast over the whole forecast period is higher than that of the 1985 Short-Term Forecast.

1-Hour Peak Demands

	Primary Load Forecast 861208		Change from Basic Load Forecast 851209		Basic Load Forecast 851209	
December	Peak MW	% Inc	MW	%	MW	% Inc
1985 Actual	20393				19259	
1986	20610	1.1	913	4.6	19697	2.3
1987	21256	3.1	1011	5.0	20245	2.8
1988	21962	3.3	1148	5.5	20814	2.8
1989	22451	2.2	1114	5.2	21337	2.5
1990	23031	2.6	1099	5.0	21932	2.8
1991	23564	2.3	1069	4.8	22495	2.6
Avg % Inc						
1985-1991		2.4				2.6
1986-1991		2.7				2.7

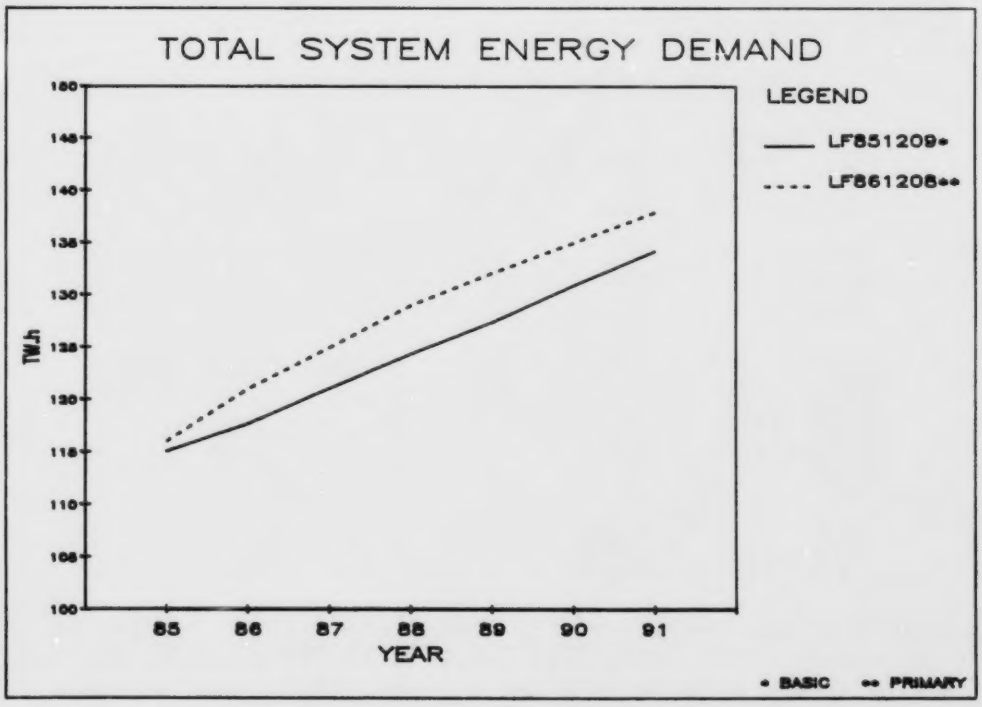


1.1.3 Comparison to Load Forecasts 851209 - Energy Demand

Energy Demand

Year	Primary Load Forecast 861208 Avg MW	Primary Load Forecast 861208 TW.h	Primary Load Forecast 861208 % Inc TW.h	Change from Basic Load Forecast 851209 TW.h	Change from Basic Load Forecast 851209 %	Basic Load Forecast 851209 Avg MW	Basic Load Forecast 851209 TW.h	Basic Load Forecast 851209 % Inc TW.h
1985	13248*	116.0*				13140	115.1	
1986	13810	121.0	4.2	3.3	2.8	13438	117.7	2.3
1987	14274	125.0	3.4	3.9	3.3	13820	121.1	2.8
1988	14690	129.0**	3.2	4.6	3.7	14166	124.4**	2.7**
1989	15079	132.1	2.4	4.7	3.7	14548	127.4	2.4
1990	15413	135.0	2.2	4.1	3.1	14941	130.9	2.7
1991	15738	137.9	2.1	3.7	2.7	15325	134.2	2.6
Avg % Inc								
1985-1991			2.9					2.6
1986-1991			2.6					2.7

* Actual
** Affected by Leap Year



1.1.4 Comparison of Primary to Basic Load Forecast: 861208

This year there is a differentiation between normal system demand and that which will result from certain expected interventions by Ontario Hydro. Formerly the Load Forecast did not specifically include the results of these efforts. The following table lists the two components of the Short-Term Load Forecast: the Basic Load Forecast, derived as in previous years, which includes the effects on demand of research, education and promotion; and the Primary Load Forecast, produced by adjusting the Basic Load Forecast for the impact of expected Ontario Hydro indirect financial incentives to be provided to our customers to reduce their peak demand. The initial estimates for indirect incentives were the most recent at the time when the Short-Term Primary Load Forecast was being produced. Since then, the estimates for indirect incentives have been revised -- these estimates can be found in Section 2.5.

The forecast of Primary Demand includes the reductions due to:

(1) Customers' response to changes in rate structure such as time-of-use, off-peak incentives, blended power rates, etc.;
(2) Financial incentives such as grants or loans, etc.

The Primary Load Forecast figures have been calculated by subtracting the December peak power reductions established for future years from the Basic Load Forecast peak demands. The other monthly peaks and the annual energy have been adjusted to correspond to these December peak reductions by following the customers' present class load factor in the calculation of those adjustments. In particular, the reduction to each monthly peak is assumed to apply with a linear increase over the year from zero on January 1 up to the December year-end value for that year.

Load Forecast 861208: Primary vs Basic

	December Peak - MW				Energy - GW.h			
Year	Basic	Indirect Incent	Primary	% Diff	Basic	Indirect Incent.	Primary	% Diff
1985 Actual	20393	0	20393	0.0	116049	0	116049	0.0
1986	20610	0	20610	0.0	120974	0	120974	0.0
1987	21256	0	21256	0.0	125039	0	125039	0.0
1988	21987	25*	21962	0.1	129126	86*	129040	0.1
1989	22526	75*	22451	0.3	132431	339*	132092	0.3
1990	23206	175*	23031	0.8	135867	846*	135021	0.6
1991	23839	275*	23564	1.2	139390	1522*	137868	1.1
Avg. % Inc.								
1985-1991	2.6		2.4		3.1		2.9	
1986-1991	3.0		2.7		2.9		2.6	

It is apparent that the overall system load factor is not changed by this adjustment procedure. This means that there is no allowance for the possibility of energy demand spilling into the non-peak hours, such as could take place under time-of-use rates, off-peak incentives, etc.

* Initial Estimates

1.1.5 Regional Estimates

To initiate the short-term forecasting process, the Load Forecasts Department asks the regional offices to provide six-year peak estimates of all wholesale customers (municipalities and direct industrial) and total retail customers. The regional staff, using the results from a time-series model provided by the Load Forecasts Department, together with their knowledge of the local economy and consultation with large customers, prepares an estimate for each month of the current year and the first forecast year. For the subsequent four years, only December forecasts are made.

The customer forecasts reflect their own peak demand not coincident in time with the system peak, and not including transmission losses. The estimates which underlie this forecast are higher than the previous set (shown in the 1985 Short-Term Forecast). The latest estimates are about 2% higher than last year for 1986, increasing to a 6% difference by 1990.

Sum of Customers' Loads - MW

Average Monthly 1-Hour Non-Coincident Peaks

Year	1986 Short-Term Load Forecast	1985 Short-Term Load Forecast	Differences	% Change
1986	18293	17958	335	1.9
1987	19058	18542	516	2.8
1988	19777	19034	743	3.9
1989	20548	19564	984	5.0
1990	21281	20075	1206	6.0
1991	22014	N/A	N/A	

The municipal utilities, the area offices, and the direct customers are believed to have the best and most detailed information about plans in their own neighbourhoods and businesses. They have the best perspective on new developments requiring electricity, on local business anomalies and on the continuity of existing sales. These estimates are believed to be reliable for the near term.

However, the rapid growth in the last quarter of 1985 and the first quarter of 1986 obviously influenced the customer's estimates. The projected rates of growth of the regional estimates are therefore higher than can realistically be expected to be maintained. This year's forecast needs more adjustment in terms of unallocated load than last year's forecast, especially for the mid-term beyond two years.

1.2 Commentary

1.2.1 Considerations Affecting the 1986 Short-Term Forecast

A number of factors combine to influence the forecast of the level of peak and energy, such as forecasts of the economy, energy prices and weather. These factors at the time the Short-Term Forecast was produced in spring of 1986 are discussed below.

(1) Economic Outlook

The strong growth of the last quarter of 1985 and the first quarter of 1986 was forecast to moderate somewhat during the second half of 1986. While a decline was seen in the strength of the bellweather automotive industry due to weakening exports and domestic demand, it was expected that construction, consumer spending and capital investment would continue to buoy the Ontario economy until year-end when growth rates will moderate further. It was expected that a modest slump in consumer spending and plummeting procurement of goods for the oil and gas industry, together with completion of construction projects, would reduce 1987 real growth to 3.4%. Rather flat growth prospects for 1987 and beyond for manufacturing industries, unless a rebound in the US economy generates an increase in exports, indicated a tapering off of growth in subsequent years toward 3.0%. The table below indicates the Economics and Forecasts Division's Canadian and Ontario output projections.

Economics and Forecasts Division's Outlook
Gross Product - $1971 Billion

	Canada				Ontario			
Year	1985 May	% Increase	1986 May	% Increase	1985 May	% Increase	1986 May	% Increase
1985	144.9	3.0	147.4	4.5	56.3	3.5	59.1	5.2
1986	147.8	2.0	152.6	3.5	57.1	1.5	61.5	4.2
1987	153.0	3.5	157.2	3.0	59.1	3.5	63.6	3.4
1988	157.5	3.0	161.9	3.0	60.9	3.0	65.7	3.3
1989	162.3	3.0	166.7	3.0	62.7	3.0	67.7	3.0
1990	167.2	3.0	171.8	3.0	64.6	3.0	69.7	3.0

(2) Electricity Price Levels

The assumption was made that real electricity prices would rise by less than 1% year-over-year at the retail level for all sectors in 1986 and 1987 and then decline steadily afterward, with a significant fall in the first part of the 1990s.

Nevertheless, electricity's price competitiveness relative to both fuel oil and natural gas will deteriorate over the next few years due to the sudden but temporary (it is assumed) decline in fuel oil prices and the continuing and increasing price advantage of natural gas in all sectors.

(3) Weather

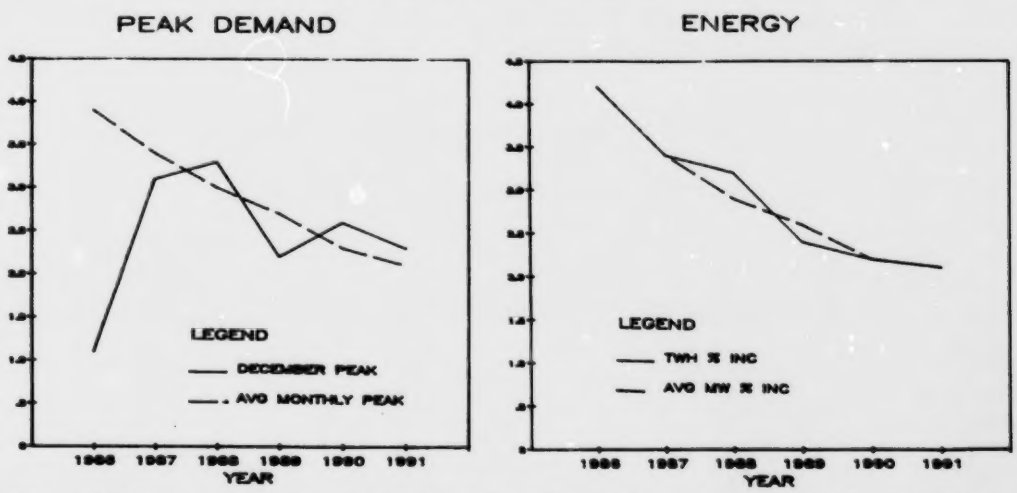
The Short-Term Load Forecast includes forecasts of energy and peak demand, with detail by month for each. The monthly actual demands, as well as the annual actual totals, are strongly influenced by weather conditions. For the purpose of the forecast, normal weather conditions, as measured by the recorded averages, are assumed. For example, the December peak is assumed to occur on the coldest working day in December, which is assumed to have a temperature equal to the average coldest day in December.

(4) Source of Fluctuation of Growth Rates

Table 1.1.1 and the graphs below show a gradual decline in growth rates for the average of the monthly peaks and the annual energy. In contrast, the growth rates for the December peaks range from 1.1% to 3.3%.

Short-Term Primary Load Forecast
861208

PERCENT INCREASE



December 1986's growth from 1985 is low since the actual peak in December 1985 was remarkably high. In effect December 1986's growth has been usurped by December 1985 due to strong economic growth in that month. The rise in December 1988's growth, and the dip in December 1989's growth, are explained by two factors. The first factor arises from the fact that the direct customers as a class provided forecasts of 5.0% and 0.7% growth in December peak for 1988 and 1989 respectively, on a year to year basis. This is not consistent with their class's forecasts of average monthly peaks, due to timing of their new loads during the years in question. This result boosts the forecast for the first December and depresses the growth for the second. The second contributing factor is the significant reduction in line losses expected during the second half of 1989 by the incorporation of the second 500 kV transmission line from Bruce GS to the major load centres. Since this will occur only in mid-year, December's figure is substantially affected while the average of the year's monthly peaks is reduced by less.

These two factors account for most of the fluctuation from the smooth trend for 1988 and 1989.

1.2.2 The Unallocated Load

The customer surveys form an important part of the data used in generating the forecast, but they are only one part of the comprehensive information incorporated in the Basic Load Forecast. To reconcile the total of the customer estimates to the Basic Load Forecast, an amount may be added or subtracted. This amount is called unallocated load.

Over a medium term, growth in electricity demand is closely related to increases in the total of facilities using electricity. New users of electricity include new housing units, new stores or office buildings, and new or expanded factories. Ontario Hydro direct customers, the Ontario municipal electrical utilities, and our own regional offices have relatively good data on the expected total of such new activity, since they are usually contacted early in the planning process for any new additions. Therefore, the Load Forecasts Department recognizes that the customer estimates contain information that the Department does not have. However, the Department also has information that the customers do not have. This information includes economic forecasts and skill in their interpretation, access to computer-based models for the entire system, and the skill and experience of full-time forecasters. The resulting Basic Short-Term Load Forecast is then compared to the sum of customer's loads and the difference is the unallocated load.

Sum of Customers' Loads - MW

Average Monthly 1-Hour Non-coincident Peaks

Year	Customer Survey	Unallocated Load	1986 Basic Short-Term Forecast
1986	18293	-86	18207
1987	19058	-228	18830
1988	19777	-372	19405
1989	20548	-541	20007
1990	21281	-701	20580
1991	22014	-892	21122

The amounts of unallocated load shown in the table are well above those in last year's report. They reflect customers' optimism in the light of high growth in late 1985 and early 1986.

1.2.3 Short-Term Forecasting Models

Short-term forecasting models allow a comparison to be made with the regional estimates. This comparison may result in a final adjustment to the forecast.

The Load Forecast Department has over the past few years developed and tested various short-term forecasting models: Box-Jenkins time series analysis, State-Space models, and Econometric Regression models.

The Box-Jenkins and the State-Space models proved to be sensitive to month-to-month variations in the data due to their highly autoregressive structure. These models tend to perform better in the very short term (one to three months). For longer forecast periods, they tend to over-react to short-run variations. Econometric Regression models, on the other hand, are less sensitive to monthly deviation and they have the additional advantage of incorporating the effects of the external factors such as the state of the economy and relative energy price changes.

1.3 Losses

Transmission losses are incorporated in the figures for the Short-Term Forecast. These losses have averaged approximately 4.0% of customer energy for the period 1981 to 1983. Since 1984 losses have been gradually increasing, reaching 4.3% in 1985. This unfavourable trend will continue for a few years due to the increased load on limited and inadequate transmission lines from Bruce, caused by new, low-cost generation units coming into service without corresponding increases in transmission capacity.

As expected, losses in 1986 were higher than 1985 with the addition of Bruce 7 and Bruce 8. There will be no relief from this situation until the new 500 kW line is brought into service, currently scheduled for mid 1989.

Forecast losses were assumed to be 4.6% for years 1986 to 1988, 4.4% in 1989 and 4.2% for remaining years.

1.4 Capacity Interruptible Loads

In general, capacity interruptible loads are those which can be interrupted under contract provisions in exchange for which power is sold at a rate more favourable to the customer.

Capacity Interruptible Loads - East System

Sum of Non-Coincident Customers' Capacity Interruptible Load
December Monthly Peak - MW

Interruptible	1986	1987	1988	1989	1990	1991
25 Hz	3.3	16.5	16.5	16.5	16.5	16.5
60 Hz	702.8	688.7	777.0	753.8	760.8	765.1
Total	706.1	705.2	793.5	770.3	777.3	781.6
In Terms of Generation*						
25 Hertz MW	3	14	14	15	15	15
60 Hertz MW	597	601	656	667	671	674
Total	600	615	670	682	686	689

* At time of East System Peak

Currently only one customer in the West System has a capacity interruptible contract. West System's December Interruptible load in terms of generation is as follows:

1986 - 27.0 MW
1987 - 27.0 MW
1988 - 27.0 MW
1989 - 27.0 MW
1990 - 27.0 MW
1991 - 27.0 MW

1.5 Performance of Load Forecast No. 851209 to End of 1986

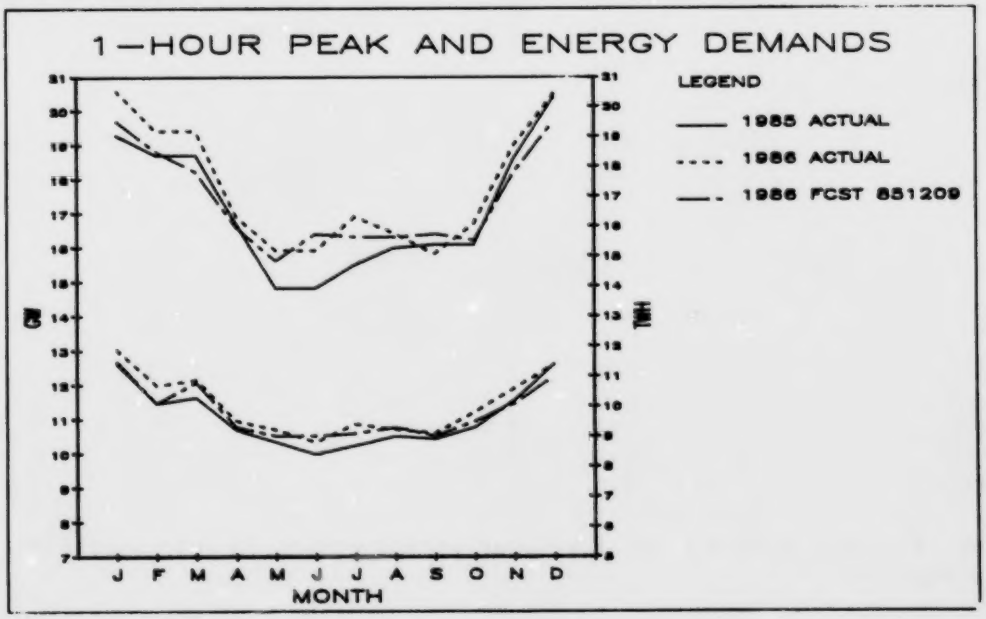
Peak and Energy

This section evaluates the performance of last year's forecast against the actual monthly peak and energy data for 1986. With the exception of June, August and September, 1986 where normal air-conditioning load forecasted never materialized due to below average temperatures, Load Forecast 851209 has consistently under-forecasted demand. The greatest deviations from forecast have been in the first quarter during a period of strong economic growth. These high deviations from forecast tapered off along with economic growth in the second and third quarter and the final results for 1986 are consistent with the updated forecast presented by this Division to the OEB in June of 1986.

The slowdown in Ontario's economy in the fourth quarter of 1986 was not enough to cause an over-prediction in Load Forecast 851209. In this period, actual demand was, on average, 2.4% greater in peak and in energy than Load Forecast 851209.

	1-Hour Peak - GW					Energy - TW.h				
	Actual			1986		Actual			1986	
	1985	1986	Yr/Yr Growth	Forecast 851209	% Dev *	1985	1986	Yr/Yr Growth	Forecast 851209	% Dev *
Jan	19.2	20.6	6.9	19.7	4.7	11.4	11.9	4.0	11.5	2.9
Feb	18.7	19.4	4.2	18.8	3.3	10.1	10.7	6.4	10.1	6.2
Mar	18.7	19.4	3.5	18.2	6.1	10.4	10.9	4.7	10.8	0.9
Apr	16.7	16.9	1.3	16.6	1.7	9.2	9.5	3.1	9.3	1.8
May	14.8	15.9	7.5	15.6	2.0	8.8	9.2	4.9	9.0	2.5
Jun	14.8	15.9	7.4	16.4	-3.2	8.4	8.8	4.5	9.0	-2.1
Jul	15.5	16.9	8.9	16.3	3.3	8.9	9.4	5.9	9.1	3.2
Aug	16.0	16.4	2.7	16.3	0.8	9.0	9.2	2.3	9.3	-0.5
Sep	16.1	15.8	-2.3	16.4	-3.9	8.9	9.1	2.0	9.0	0.9
Oct	16.1	16.7	3.9	16.2	3.3	9.3	9.8	5.4	9.5	3.8
Nov	18.6	19.0	2.4	18.2	4.6	10.2	10.6	4.2	10.1	5.2
Dec	20.4	20.5	0.7	19.7	4.3	11.4	11.4	-0.1	11.0	3.4
Avg	17.1	17.8	3.8	17.4	2.4	Tot 116.0	120.6	3.9	117.7	2.4

* Per cent deviation from forecast.



2.0 LONG-TERM FORECAST - 1991 TO 2005

To plan the size of the power system needed to meet future demands, a long-range 20-year forecast, know as the Long-Term Load Forecast, is produced each fall. This forecast is more comprehensive and far-reaching than the Short-Term Forecast.

This section highlights the results of the Long-Term Primary Load Forecast and compares the peak and energy forecasts with Load Forecast 851209. As well, this section includes the results of two different approaches to forecasting, the econometric model - EDEM, and end-use models, as well as two approaches to establishing confidence intervals; statistical band of uncertainty based on historical forecast performance and alternative macroeconomic scenarios based on the EDEM model. The impact of Ontario Hydro's marketing activities are discussed to close off this section.

2.1 Highlights

2.1.1 Load Forecast 861208

Long-Term Primary Load Forecast: 861208

	December 1-Hour Peak			Annual Energy		
		Annual* Growth			Annual* Growth	
Year	MW	MW	%	TW.h	TW.h	%
Short Term						
1985 Actual	20393			116.0		
1986	20610	217	1.1	121.0	4.9	4.2
1987	21256	646	3.1	125.0	4.1	3.4
1988	21962	706	3.3	129.0**	4.0	3.2
1989	22451	489	2.2	132.1	3.1	2.4
1990	23031	580	2.6	135.0	2.9	2.2
1991	23564	533	2.3	137.9	2.8	2.1
Long Term						
1995	25203	434	1.8	152.3	3.5	2.4
2000	27508	461	1.8	167.2	3.0	1.9
2005	30015	501	1.8	182.8	3.1	1.8

Average Annual Growth

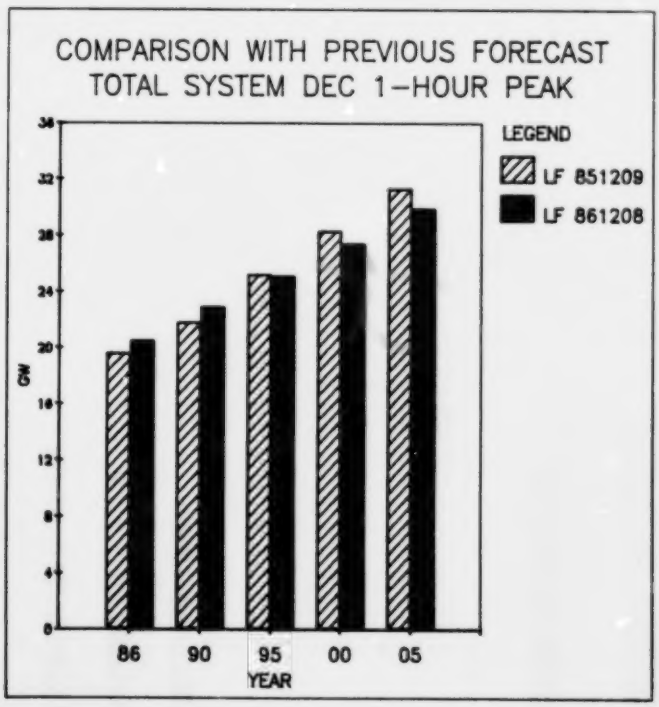
Period	MW	%	TW.h	%
1986-1991	591	2.7	3.4	2.6
1986-1995	510	2.3	3.5	2.6
1986-2000	493	2.1	3.3	2.3
1986-2005	495	2.0	3.3	2.2
1996-2005	478	1.7	3.0	1.8

* Values for long term are for five-year period ending in year specified.
** Leap Year.

2.1.2 Comparison with Load Forecast 851209 - Peak Demand

December 1-Hour Peak Demands

Year	1986 Recommended Primary Load Forecast (MW)	Basic Load Forecast 851209 (MW)	Increase over 851209 MW	%
Short Term				
1985	20393 (Actual)	19259		
1986	20610	19697	913	4.6
1987	21256	20245	1011	5.0
1988	21962	20814	1148	5.5
1989	22451	21337	1114	5.2
1990	23031	21932	1099	5.0
1991	23564	22495	1069	4.8
Long Term				
1995	25203	25335	-132	-0.5
2000	27508	28411	-903	-3.3
2005	30015	31440	-1425	-4.7

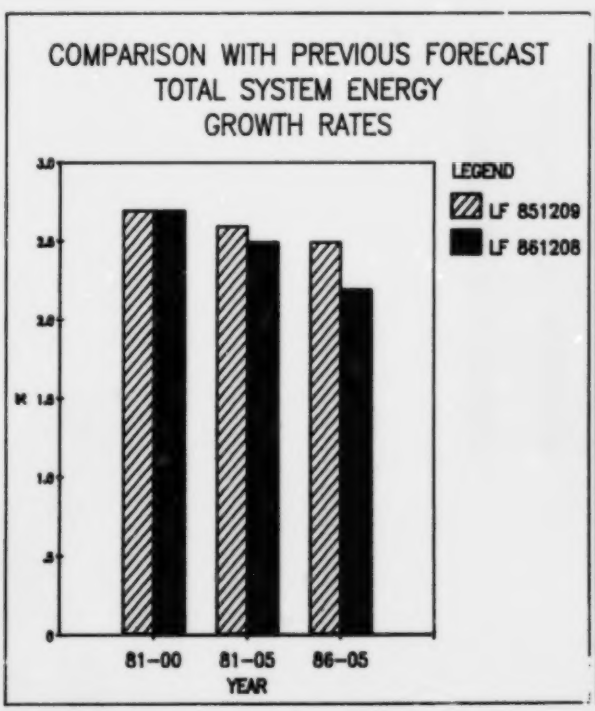


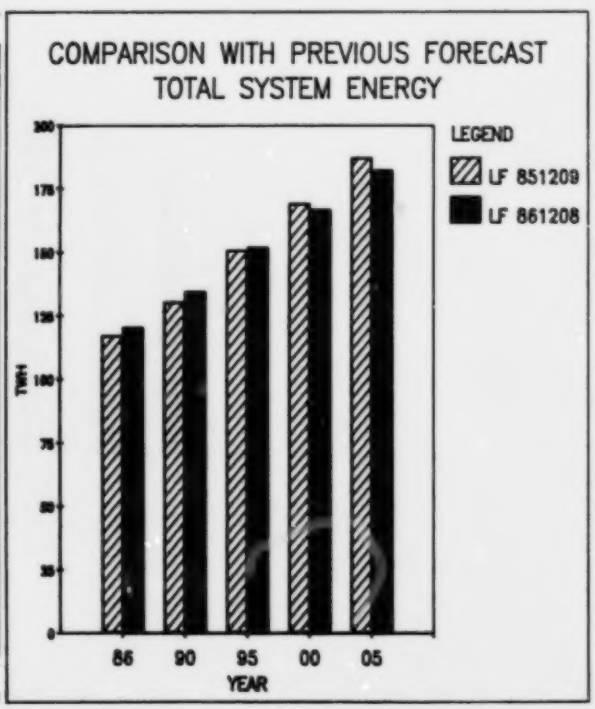
2.1.3 Comparison with Load Forecast 851209 - Energy Demand

Energy Demand

Year	1986 Recommended Primary Load Forecast (TW.h)	Basic Load Forecast 851209 (TW.h)	Increase over 851209 TW.h	Increase over 851209 %
Short Term				
1985	116.0 (Actual)	115.1		
1986	121.0	117.7	3.3	2.8
1987	125.0	121.1	3.9	3.3
1988	129.0*	124.4	4.6	3.7
1989	132.1	127.4	4.7	3.7
1990	135.0	130.9	4.1	3.1
1991	137.9	134.2	3.7	2.8
Long Term				
1995	152.3	151.2	1.1	0.7
2000	167.2	169.5	-2.3	-1.4
2005	182.8	187.6	-4.8	-2.6
Growth Rates				
1986-2000	2.3	2.6		
1988-2005	2.2	2.5		
1988-2005	2.1	2.4		

* Leap Year





2.1.4 Comparison of Load Forecast 851209 to Basic Load Forecast 861208

When comparing the 861208 Basic forecast with Load Forecast 851209, you will note that although the 851209 growth rates are marginally higher, both peak and energy of the 861208 forecast is higher over the entire forecast period. Specifically, the 189.5 TW.h projected for the year 2005 is 1.9 TW.h higher than Load Forecast 851209. This reflects actual experience of recent years where a stronger than expected economic recovery pushes electricity sales significantly above forecast levels.

Basic Load Forecast Comparison

	December One-Hour Peak - GW				Energy - TW.h			
Year	Load Forecast 851209	Load Forecast 861208	Difference GW	%	Load Forecast 851209	Load Forecast 861208	Difference TW.h	%
1992	23.120	24.428	1.308	5.7	137.973	142.833	4.860	3.5
1993	23.831	25.014	1.183	5.0	142.219	146.262	4.043	2.8
1994	24.570	25.656	1.086	4.4	146.624	150.014	3.390	2.3
1995	25.335	26.358	1.023	4.0	151.189	154.116	2.927	1.9
1996	25.815	27.055	1.240	4.8	154.055	158.195	4.140	2.7
1997	26.440	27.746	1.306	4.9	157.783	162.235	4.452	2.8
1998	27.052	28.393	1.341	5.0	161.436	166.018	4.582	2.8
1999	27.720	28.960	1.240	4.5	165.423	169.335	3.912	2.4
2000	28.411	29.508	1.097	3.9	169.547	172.540	2.993	1.8
2001	29.046	30.162	1.116	3.8	173.338	176.360	3.022	1.7
2002	29.601	30.750	1.149	3.9	176.650	179.797	3.147	1.8
2003	30.190	31.345	1.155	3.8	180.166	183.277	3.111	1.7
2004	30.804	31.886	1.082	3.5	183.829	186.439	2.610	1.4
2005	31.440	32.405	0.965	3.1	187.623	189.479	1.856	1.0
Growth Rates								
1986-2000	2.7	2.6			2.6	2.6		
1986-2005	2.5	2.4			2.5	2.4		
1988-2005	2.5	2.3			2.4	2.3		
1992-2005	2.4	2.2			2.4	2.2		

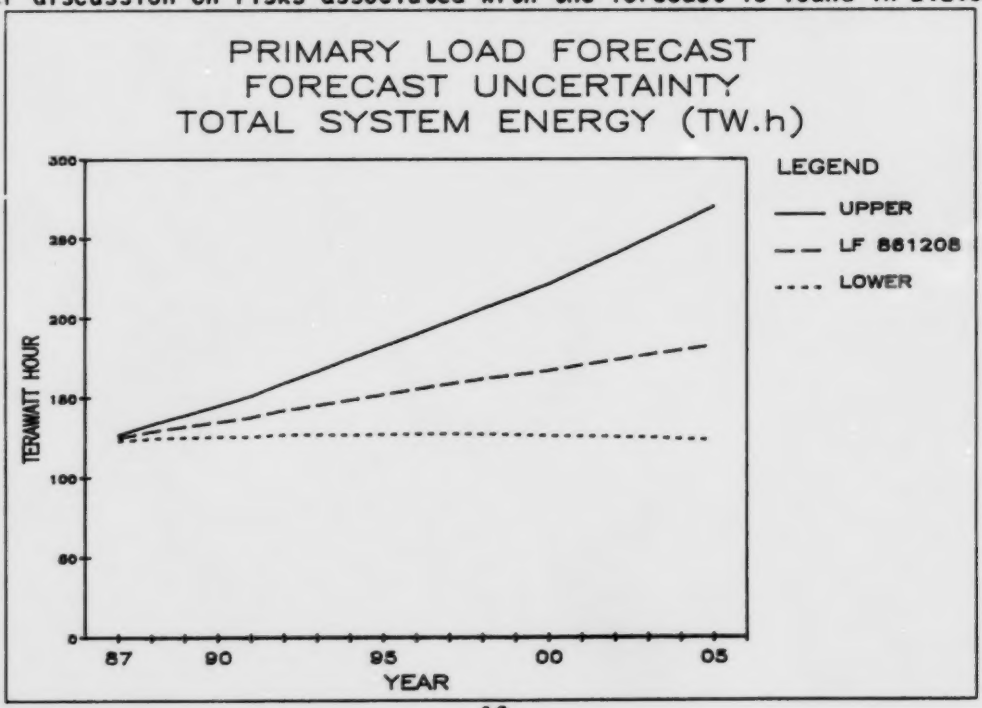
2.1.5 Forecast Uncertainty

Historical load forecast performance is used as the basis for calculating the statistical uncertainty associated with the 1986 Primary Energy Forecast. The upper and lower limits given below specify a band of uncertainty such that there is a 40% probability of the actual energy demand falling outside of the range shown.

	Annual Energy (TW.h)		
	Lower	Forecast	Upper
1987	122.9	125.0	127.2
1990	125.5	135.0	145.2
1995	127.1	152.3	182.5
2000	125.8	167.2	221.6
2005	123.0	182.8	270.0
Growth Rates			
1987-2000	0.2	2.3	4.4
1987-2005	0.0	2.1	4.3

To gain a perspective on the size of this uncertainty, it should be noted that in 2005, the width of the uncertainty band is roughly 1/3 larger than the energy generated in Ontario in 1985.

The above uncertainty is associated with the past forecast errors alone. A further discussion on risks associated with the forecast is found in 2.2.3.



2.2 Commentary

2.2.1 Methodology of the Long-Term Basic Load Forecast

Electricity demand depends, in the long run, on a large number of factors and a complex set of interrelationships between them. Forecasting models can be built in several different ways, to take advantage of different levels of assumptions and known qualities about these interrelationships.

For example, total electricity demand can be derived by adding up the demand created by each and every end-use of electricity. A forecast taking this approach, called an end-use forecast, requires projections of activity in each sector and industry along with forecasts of electricity and energy use at each activity level as technology improves in the future. In this sense the model is engineering-oriented. The critical task to be done by the forecaster in implementing an end-use model is in the making of assumptions and projections regarding activity levels and electricity utilization technologies in as much detail as needed at the bottom level of the model.

Another way of forecasting electricity demand is to model explicitly the fundamental relationships among its determinants. Such a system of relationships can be quite complex. One way to do this is with a long-term demographic-macroeconomic model linked with sectoral models for distinct sectors of the economy (residential, commercial and industrial). This model is driven by demographics and detailed knowledge about the present structure and trends of macroeconomic relationships within sectors and industries. The outputs of such a complex model consist both of total energy demand in the future and the market shares of electricity and other fuels. This approach is called multi-equation econometric modelling.

The Load Forecasts Department has maintained separate models for each of the above approaches.

The use of more than one model allows the forecaster to take into account more of the available information about the past in order to assess the future. Any differences between the forecasts are instructive, since they can be traced directly to the model or to the underlying assumptions. This gives the forecaster the ability to ensure consistency and the validity of the final forecast recommended.

Similar considerations apply to short-term forecasting also. However, in the short term, the variability of weather affects electricity demand more than the set of variables relating to the level of economic activity, fuel prices, or demographics. Demand in the short term is also heavily determined by the existing stock of energy-using capital equipment, which tends to change only very slowly. Therefore it is more useful to view demand in the short term as primarily related to demand in the recent past, and then to apply a knowledge of external changes and judgment to round out the energy demand picture.

This long-term forecast is consistent with the short-term forecast approved in September of 1986.

2.2.2 Discussion of Major Assumptions

A forecast based on the methodologies described in the previous section requires assumptions about some set of variables which represents the important influences on electricity demand, such as economic growth and relative energy prices. The number of such variables can range from one for the most simple single-equation model to several thousands for the end-use model. The basic assumptions are common to all three models, but other key assumptions are made independently. The resulting forecasts therefore maintain a degree of independence, and provide a load forecaster with information both on the forecast and on the effect of different approaches.

The most important two factors in any model (computerized or mental) of the demand for electricity in the long run are the projections of the general level of economic activity and of the price of electricity relative to other fuels. These factors can be incorporated into the models and the forecasting procedure in any of several ways. Because these factors are so central, each of the models has been run using similar assumptions for them. This approach allows the model results to reflect important differences in other kinds of assumptions, and allows the forecaster to understand the sources of the differences.

Major Assumptions

Economic growth will follow the path outlined in the most-likely forecast of the Economics and Forecasts Division's Economic Outlook, Annual Review 1986. This outlook predicts real economic growth in Ontario averaging about 2.8 per cent per year over the period 1986 to 2005. Following trends in population growth, the trend rate of economic growth will decline after the year 2000.

Ontario population in the year 2005 will be just over 10.8 million.

Ontario labour force in the year 2005 will be 5.8 million, at an average participation rate of just under 70 per cent. The unemployment rate will decline slowly from present levels to 6% by the year 2001.

The price of electricity will decline slightly in real terms from 1989 to the mid-90s. The price will then increase slightly in real terms for residential and industrial customers while commercial customers will see a slight decrease. It will fall relative to oil and gas prices over the period 1989 onwards.

The **rate of technical progress** will recover from its recent negative values to a level below the average of the 1960s, but above the average of the last decade.

The **stability** of social, economic, and financial institutions will be retained. No international financial crisis will seriously affect the Canadian financial system. There will be no major supply disruptions in basic commodities, like fuels.

(1) Economic Growth

The current (1986) Annual Economic Outlook forecasts a level of Gross Domestic Product (GDP) in Ontario of just over $102 billion (1971 dollars) in 2005, an

increase of 3.6 per cent over the last year's economic outlook. This increase in the level of economic activity corresponds to an increase of about 0.1 per cent per year in the average annual growth rate from 1985 to 2005. Most of the increased growth occurs in 1985 and 1986, reflecting Ontario's strong industrial performance and a gain in population at the expense of the Western provinces. The inflation outlook is also noticeably improved, as a result of the assumption that tight monetary policies will be continued into the 1990s.

Economic Outlook

	Ontario Real GDP (1971$ x 10^6)				Ontario Consumer Price Index (1981 = 100)			
	Fall 1985	%*	Fall 1986	%*	Fall 1985	%*	Fall 1986	%*
1986	59,568	2.5	61,530	4.2	128.7	4.6	128.5	3.9
1990	67,370	3.0	69,792	3.0	170.8	6.0	160.9	5.5
1995	78,480	3.1	81,301	3.1	228.6	6.0	205.3	5.0
2000	88,793	2.5	91,985	2.5	298.7	5.5	268.4	5.5
2005	99,000	2.2	102,558	2.2	399.7	6.0	350.8	5.5

*Annual Growth Rate 1986 and 1990, 5 year annual average 1995-2005

(2) Energy Prices

Dramatic developments in the oil market at the beginning of 1986 have resulted in a substantial downward revision of the world oil price forecast in the short term. The long-term forecast is similar to that of previous forecasts -- weakness and downward pressure on oil prices in the 1980s is projected to be followed by upward pressure in the 1990s. However, the weakness in the 1980s has been accentuated and the rebound in the 1990s occurs at a faster rate from a much lower base. The world oil price is projected to increase from a current (September 1986) level of US$13.70 (in 1985$) per barrel to about US$16 (in 1985$) per barrel by 1990 and about US$25 by the year 2005.

Deregulation of the domestic oil market is expected to continue. However, domestic oil prices are forecast to escalate faster than the rate of increase of world oil prices due to a projected depreciation of the Canadian dollar against its U.S. counterpart. By the year 2005, the cost of crude at Toronto is projected to be about $34 (in 1985$) per barrel. This compares with a current price of $21.50 (in 1985$) per barrel. The Canadian natural gas market is expected to make another step toward deregulation in 1986, although some form of government regulation will remain. The wholesale price at Toronto is projected to fall in real terms for the rest of the 1980s from a current level of $3.80 per MMBtu (to about $3.25 per MMBtu by 1990), and rise again in real terms in the 1990s (to about $4.40 per MMBtu by 2000).

Over the next couple of years (1986-1988), electricity's price competitiveness is projected to deteriorate. This is a continuation of the unfavourable trend for electricity that started in 1983. However, the long-term energy price trends are still expected to be characterized by improvement in electricity's relative price.

2.2.3 Risks to the Forecast

The principal risks identified for the forecast include the rate of real economic growth, the Ontario Hydro rate levels and structure, the prices of other fuels, and the effect of Ontario Hydro's marketing program.

In the forecast as reported in this document, some of the risk associated with these uncertainties is addressed by the use of three alternative scenarios (in addition to the most likely). Each scenario shows the impact on system demand of a set of coordinated alternative assumptions about economic growth (including population growth) and energy prices. The scenarios allow some explicit consideration of the outcomes possible given underlying conditions different from those envisioned in the central forecast. The forecasts of electricity demand made for each of these scenarios indicate a wide range of risk arising from the economic outlook alone.

Previous forecasts have identified the sensitivity of the forecast to assumptions of electricity prices. Because of this sensitivity, the effect of electricity prices on demand and effect of demand on electricity prices have both been taken into account during the forecast process. This ensures that assumptions about electricity demand and prices are not inconsistent with each other.

The sensitivity of the load forecast to the prices of competing fuels is similar to that for changes in the price of electricity, and in fact it is relative prices that are of primary importance.

Some impact of the Ontario Hydro marketing program of research, education and promotion is assumed for the Basic Load Forecast. A further assumption of the size and effectiveness of Ontario Hydro indirect incentive programs is assumed for the Primary Load Forecast. A much better or worse performance relative to either of these marketing targets would affect the rate of load growth significantly, especially over the next ten years. However, the risk in this area is somewhat controllable since the nature and extent of Ontario Hydro's marketing efforts can be modified fairly quickly.

Given the sources of external uncertainty, in addition to the uncertainty attached to the load forecasting process itself, the necessity for care in the use of the load forecast cannot be overstressed. The load forecast cannot be used as only a single number; the sources and consequent ranges of forecast error must be considered as well.

For this reason, the band of error associated with the forecast is as important as its central tendency.

2.3 Results of Forecasting Models

To quantify the effects of the complex network of factors that determine energy demand in the longer term, the results from an economic and end-use model are both analyzed. The long-term forecast is then integrated with the short-term forecast and final judgement changes are made. The resulting forecast is referred to as the recommended or official Basic Load Forecast.

2.3.1 Economic and Demographic Energy Model--EDEM

Introduction

EDEM is an econometric model. The relationship between energy consumption and the variables which determine the level of this consumption has been estimated for the period 1962 to 1985. EDEM predicts the level of consumption for Ontario as a whole by individual fuel -- electricity, natural gas, oil and coal -- and by consuming sector -- residential, commercial and industrial. The major factors which influence the level of consumption are scale factors -- such as the number of households and the level of output -- fuel prices and exogenous time trends. The relationships between pair-wise variables are usually summarized by elasticities which measure the responsiveness of the variable of interest to the factors noted earlier. Forecasts of these variables are then explicitly inserted into the estimated relationship to forecast the energy demand.

Demographics and Key Economic Assumptions

Two facets of the relationship between the demographic and economic forecasts in the Economic Outlook and the EDEM model will be explained.

(a) Demographics

The detailed demographic forecast contained in the Economic Outlook was derived using the demographic portion of the EDEM model. The assumptions which determine total population include fertility rates, migration (including immigration) and mortality rates.

These demographic variables affect the load forecast in two ways:

(1) Via the number of households, which is an important determinant of energy use, directly in the residential sector and indirectly through the demand for output in the commercial and industrial sectors.

(2) Via population, which is an important determinant of the labour force. The other determinant of the labour force is the participation rate. Age-sex specific participation rates are assumptions in the model. These assumptions take into consideration social trends, such as increased leisure, and the impact of economic growth on the demand for labour.

Details of the demographic forecast are available upon request.

(b) Economic Growth

EDEM has its own macro-economic forecasting module. The module was built specifically to model long-term potential growth rather than short-term fluctuations around this path. Long-term growth is determined by the rate of growth of capital and labour and the rate of technical progress. The rate of technical progress is that growth in economic output which cannot be explained by the growth in the labour force or the capital stock. Thus, the key economic assumptions in EDEM relate to the rate of technical progress, the unemployment rate, the date at which the economy reaches the long-term growth path and whether the economy is growing at its full potential or somewhat below it.

The forecast of economic growth in EDEM is tuned to the Annual Economic Outlook, not only ensuring consistency but also providing a cross-check on the long-term forecast contained in the Annual Economic Outlook. The implicit rate of technical progress embedded in the Annual Economic Outlook is made explicit and its reasonableness can then be assessed.

In the current forecast, the long-term rate of technical progress (rtp) is around 1% per year. After a relatively high level in 1984 of 3.25%, due to the strong economic recovery, rtp is projected to trend downward to its long-run level, reaching it by 1996. This forecast implies a significant turn-around in the growth of total factor productivity, which has been falling over much of the last decade, and as yet has not shown much sign of recovery not related to cyclical factors.

However, as computer technology becomes even more pervasive and makes production in general more efficient, and given that energy prices have decreased significantly recently and are likely to be stable over the medium term it is reasonable to expect a return to higher and more stable productivity growth. Generally lower tariff protection in Canada, which is projected in the Economic Outlook, is also expected to boost productivity by forcing manufacturers to be more competitive. Without such productivity growth, it is difficult to predict sustained economic growth in Ontario for the next two decades.

The long-run unemployment rate is assumed to be six per cent. This is basically a judgment on the political acceptability of unemployment in the long term, and not a particular assumption on the effect of economic growth on the labour force.

Finally, EDEM is assumed to reach its long-run growth path in the mid-1990's and the Ontario economy is assumed to grow at a fraction below full potential, thus allowing for some spare capacity.

(c) EDEM Results - Base Case

Results are shown below.

Year	Residential TW.h	Commercial TW.h	Industrial TW.h	Adjustments** TW.h	EDEM Basic Electric Energy TW.h
1986	33.1	38.4	45.7	3.8	121.0
1990	34.0	43.9	50.6	1.8	130.3
1995	37.4	51.5	58.7	3.5	151.1
2000	40.9	58.6	68.7	4.5	172.7
2005	42.9	66.0	76.5	6.7	192.1
Growth Rates*					
1986-1990	0.7	3.4	2.3		1.9
1986-2000	1.5	3.1	3.0		2.6
1986-2005	1.4	2.9	2.7		2.5

* Average annual per cent change.
** Ontario Hydro losses less Ontario electricity not sold by Hydro, including co-generation and purchases from non-Hydro generators.

Changes in the residential sector's energy consumption can be caused either by changes in appliance stocks or in the utilization of these appliances, or both. Since time-series data on the use of individual appliances do not exist, indices are created of aggregate appliance saturation and aggregate appliance utilization. Saturation measures the number of appliances per household.

The net result is that total residential electricity use is forecast to increase at a compound rate of 1.4 per cent over the period from 1986 to 2005, about 1% less than the growth rate of total electricity demand. In fact, the rate of growth of residential demand follows a downward trend from the late 1990s on, due to the slowing down of population growth, continually pulling down the growth of total electricity demand.

The commercial sector has faster growth rates of both total energy and electricity than the residential sector, electricity growth averaging 2.9 per cent a year for the period 1986 to 2005. Electricity's share of the commercial market stays around 32 per cent for the entire period 1986 to 2005.

In the industrial sector (manufacturing and mining), electricity growth averages about 2.7 per cent a year between 1986 and 2005, while total energy grows slightly more slowly. Electricity's share of this market, therefore, increases from 21.3 per cent in 1986 to 22.2 per cent in 2005. This is a slightly greater relative increase in market share for electricity than is projected for the commercial sector.

2.3.2 End Use Forecasting Model Results

(i) Concepts

End-use modelling uses a conceptual approach to energy studies different from that found in most traditional analyses. It is a 'bottom-up' approach as opposed to the 'top-down' nature of most econometric models. The analysis starts with the initial stock of energy using devices, and an estimate of future demand for the services of these devices. Energy conversion efficiency of existing equipment, penetration of higher efficiency equipment, and relative fuel shares for each end use are analyzed and input to the system at the most disaggregate level. The model then combines these components and arrives at the aggregate of secondary*, and ultimately, the primary** energy demands. The disaggregate nature of the analysis is a distinguishing feature of the end-use approach. As the emphasis in utility planning shifts from supply-side planning to a balance between supply- and demand-side programs, interest in utilities moves towards analyzing the load rather than taking it as given. The level of disaggregation in the end-use models permits analysis of these demand-side programs.

(ii) Sectoral Analysis

a. RESIDENTIAL

a.1 Demographic and Housing Projections

The driving variable in the residential sector is the occupied housing stock and it is determined by the demographics as discussed in the section on EDEM. The main features of the housing stock are as follows:

Ontario Housing Stock Projections: 1985-2005

Year	Existing Housing Stock ('000)	Demolition Rate (%)	Housing Completions ('000)	Net Housing Stock ('000)
1986	3026	0.15	61	3328
1990	3013	0.15	80	3635
1995	2994	0.15	70	3988
2000	2972	0.15	40	4225
2005	2950	0.15	37	4391

* secondary demand : at the customers' level
** primary demand : at the generating stations' level

Up until 1980, the composition of housing stock showed a trend towards multiple units and away from single detached. Since then, the trend seems to have changed towards single detached as fewer and fewer multiple units are being built. It is expected that single detached will continue to be the predominant housing type in the future, especially if rent controls remain. Most of the demand for multiple units is expected to come from condominiums. Current estimates are that by year 2000, 59% of all housing units will be single detached, 27% apartments, 8% semi-detached and 6% row houses.

a.2 Competition in the End Use Markets

Share of oil in space heating has dropped from 36% in 1980 to 20% in 1985. This trend is expected to continue even if not at the same rate due to the completion of the off-oil program. Natural gas made a significant gain in the space heating market, bringing its share up to 57% from 47%. Share of electricity also increased during the last five years, although not as much as natural gas, moving from 14% in 1980 to 16% in 1985. These trends are expected to continue given the present and projected future price advantages for natural gas. By year 2000, electricity's market share in space heating is forecasted to be 24%, natural gas 62%, and oil only 6%.

The main fuels in the water heating market are natural gas and electricity. Over the last five years, natural gas increased its share to 53% from 43% while electricity lost some ground in this market, its share dropping to 46% from 52%. Without aggressive marketing programs, by year 2000 natural gas is expected to have 56% of the water heating market while electricity will remain with only 43%.

Moderate growth is assumed for most of the appliances that already have saturated markets. The exceptions to this are dishwashers and clothes dryers. Saturation rates for dishwashers are expected to reach 61% by year 2000 from 40% in 1985, while clothes dryers will reach 85% from 79%. Even with improvements in appliance efficiencies, average annual electricity demand growth will be 1.7%. To avoid confusion, it should be noted that these saturation rates refer to individual appliances and differ from the aggregate index used in EDEM.

a.3 Final Demand for Electricity in the Residential Sector

Energy conservation is assumed to play an important role in the determination of Ontario's energy future. Thus, total energy use in the residential sector is projected to increase marginally by 2.5% during the period 1980 to 2000, despite a 39% increase in the housing stock.

Residential sector market shares for competing fuels are determined by marketing efforts, relative fuel prices and capital costs. As the figures below reveal, electricity will continue to increase its share of final residential energy demand in the province.

Residential Sector Energy Demand: 1980-2005

Year	Residential Sector Energy Demand (TW.h)	Electricity's Market Share (%)
1980	130.3	24.0
1985	117.5	30.9
1986	119.0	31.4
1990	126.5	33.4
1995	131.9	36.3
2000	133.5	38.9
2005	136.8	39.7

(iii) COMMERCIAL

b.1 Floorspace

The analysis in the commercial sector also starts with the building stock. There are nine subsectors and therefore nine building types. These are educational, health, offices, stores and garages, warehouses, recreational, hotels and restaurants, religious and other. The forecast of total floorspace for the commercial sector as a whole shows a growth from approximately 1.5 billion square feet in 1985 to 2.3 billion square feet in 2005. This represents a growth rate of roughly 2.1% per annum. The four largest (in 1980) subsectors experience vastly different growth patterns. Offices, the largest, will experience growth close to 3.0% per year over this entire period while education will grow only slightly and only between now and 1990. Stores will share in the building boom which is affecting offices while warehouses, the fourth largest, will experience moderate growth. The growth in offices and stores is primarily due to the continuing shift to a service economy while the stagnation in the education sector is caused by the changing demographic patterns.

b.2 Competition in the End-Use Markets

The growth in floorspace will cause a growth in total energy usage (ie, energy supplied by all fuels together), albeit at a slower rate. Total energy use will grow from its present level of 335 Petajoules (PJ) to roughly 440 PJ by 2005 -- a growth rate of approximately 1.4% per year. Energy usage patterns will also be changing over the new twenty years. Heating, the predominant end use, will continue to decline in terms of its share of total energy consumption. The main reason for this is the large conservation potential that exists in the area of space heating -- both in terms of technological improvements and the wiser use of energy in general. This will have the biggest effect on the fossil fuels. Oil usage will continue to decline while natural gas will experience slow to moderate growth. The conservation trend has had, and should continue to have, a major impact in the area of space heating demand.

b.3 Final Demand for Electricity in the Commercial Sector

In 1986 electricity demand is expected to be 32.4 TW.h. By 2005 commercial electricity demand will be roughly 52 TW.h. This represents a growth rate of

2.6% per year which is higher than the expected growth rate of commercial floorspace. There are many reasons for this. First, electricity will be used as a heating fuel in a greater number of buildings (although natural gas will still dominate the space heating market). Heat pumps will account for a large percentage of this electric heating demand. Second, air conditioning systems, although increasingly more efficient, will be installed in more and more buildings. Lighting load demand will also increase due to the increasing floorspace. However, new ballast systems, high intensity discharge lights and the like will make the average lighting system more efficient. As a result the growth of electricity demand due to lighting will be at a slower rate than that of either floorspace or total electricity demand -- approximately 1.5% per annum. Auxiliary load (the fifth end use) will experience strong growth, primarily due to the increased usage of personal computers, business machines, etc. In the end, although considerable energy savings potential exists for all end uses, more floorspace and a higher penetration of electricity using devices (ie, higher consumption per square foot) will result in the 2.6% annual growth rate for electricity.

(iv) INDUSTRIAL

The industrial sector consists of 13 specific industries and a residual category for all other manufacturing industries. The activity carried out by an industry is defined in terms of a series of processes, with alternative technologies available to perform each process. In total, the energy use of over 90 different process technologies is studied.

In simple terms, energy use within a given industry is determined by the output production rates (in physical units such as tons of newsprint) of that industry and the amount of energy required to produce a unit of output.

c.1 Output Production Rate Projections (1985-2005)

Output production rates are dependent upon factors such as GNP, construction and housing starts. Industries with input to the construction trade are forecast to show strong growth during the 1985-2005 period. Ontario production of cement is forecast to grow annually by 6% until the year 1990. Growth beyond 1990 is expected to continue at a reduced rate, down to 3% by 2005. Growth in the clay (bricks) and glass (flat glass) industries is expected to show similar trends.

The recovery of the automobile manufacturing industry is expected to continue with the number of vehicles produced increasing annually by an average of about 2.0%. The abrasives industry, which has been strongly tied to the auto industry, is actually forecast to have minimal or no growth because of the shift of the auto industry towards ceramics and plastics and away from metal components requiring abrasives use.

The food and beverage industry is mature, with growth directly tied to population growth in the province. Value of shipments is, therefore, projected to grow by between 0.7 and 1.2% annually between 1985 and 2005.

Growth within the industrial chemical industry varies according to specific output. While the production of ethylene and other organics is projected to exhibit an average annual growth of 3%, growth for chlorine and ammonia is expected to be less, with ammonia production showing a net decrease by 2005.

Growth in the iron foundries and the iron and steel industries is closely tied to GNP and auto industry growth and is projected to average 2% during the forecast period.

Near term growth for mining, milling and smelting activity is forecast at 3%, consistent with trends for nickel, copper and zinc production during the last few years. This growth is expected to taper off to 2% at the end of the forecast period.

Finally, future production levels in the pulp and paper industry are difficult to forecast because the effects on market share of the opposing forces of increased competition on the one hand and industry modernization (eg, thermal-mechanical pulping (TMP)) on the other are not accurately known. Current estimates are that industry output will continue to grow at roughly 2%.

c.2 Energy Efficiencies and Electricity Intensity

Ontario industries have shown continued improvement in energy efficiency during the last decade. The impact of energy costs on total manufacturing costs is a major catalyst for the implementation of energy management programs to reduce these costs. Improvement in energy efficiency was offset somewhat during the 1981-82 recession years, when many plants were forced to operate at less than efficient levels of production capacity.

Electricity intensity (electricity per unit of output) is expected to continue this conservation trend. Coupled with these conservation efforts, which reduce electricity intensity, is the emphasis on electricity-intensive future automation and process modernization which increases electricity intensity. The net result for a given industry may lead to reduced electricity intensity for some processes and increased intensity for others.

Of course, it is the coupling of production levels with electricity intensity which determines an industry's electricity demand. A slowdown in production levels of even an increasingly electricity intensive industry may result in reduced levels of electricity demand.

Strong growth in production levels for the cement and clay industries will increase total electricity use by almost 90% by the year 2005. Growth in electricity use by the other component of the building trade, the glass industry, is mitigated by reduced production growth in the glass container segment of this industry. Resultant electricity use is expected to grow 25% by the year 2005.

Minimal additional conservation effects are expected in the chemical industry either because processes already are highly efficient or because recently built plants are assumed to incorporate conservation measures in their design. Total energy use is expected to grow by over 70% by the year 2005.

Electricity intensity in the mining, milling and smelting industry is expected to decrease minimally from present levels. Total electricity use will be driven by the 2-3% forecasted growth in production, and is predicted to increase by 60% by the year 2005.

The auto industry's future electricity use is a combination of moderate growth in production, continued conservation efforts and an increased emphasis on automation and robotics. These factors result in a predicted 50% increase in total electricity use by the year 2005.

Conservation potential for the iron and steel industry is assumed to be somewhat greater than for iron foundries. Electricity use for both industries increases by about 40% by the end of the forecast period.

TMP penetration in the pulp and paper industry is conservatively estimated based on present levels of penetration. The level varies according to product output and is greatest for fine paper pulping at 10%. With the possibility of industry-wide conversion to TMP, this penetration and resultant electricity use would increase significantly. Present estimates are, therefore, considered conservative. The moderate growth in production levels and further conservation efforts are predicted to place growth in total electricity use by the year 2005 at 30%.

c.3 Final Demand for Electricity in the Industrial Sector

Average annual growth in electricity use in the industrial sector during the period 1985-2005 is forecast at 2.4%.

Industry	% of Industrial Electricity Demand in Year 2005
Abrasives	0.9
Agriculture	2.6
Auto Manufacturing	2.1
Cement	1.9
Clay	0.3
Food and Beverage	3.0
Glass	0.6
Industrial Chemicals	16.2
Iron Foundries	4.9
Iron and Steel	10.6
Lime	0.2
Mining, Milling and Smelting	15.3
Pulp and Paper	15.5
"Other"	25.9

Industrial chemicals, iron and steel, mining, milling and smelting and pulp and paper are forecast to be the largest individual users of electricity in 2005. These were also the major electricity users in 1985.

(v) Final Demand For Electricity - End-Use Results

Final electricity demand in 1985 was divided among the major users as follows: 38% industrial, 32% residential and 28% commercial. By 2005, these percentages change slightly to 39% industrial, 30% residential and 29% commercial.

End-Use Forecast
(TW.h)

Year	Residential TW.h	Commercial TW.h	Industrial* TW.h	Other	Total	Adjustment** TW.h	Basic Energy Demand TW.h
1986	37.4	32.4	44.1	2.2	116.0	5.0	121.0
1990	42.3	35.7	48.9	2.2	129.1	4.3	133.4
1995	47.9	40.7	55.2	2.3	146.1	5.4	151.5
2000	51.9	46.0	62.0	2.5	162.5	6.3	168.8
2005	54.4	52.3	69.3	2.7	178.7	7.3	186.0

Energy Growth Rates(%)

1986-2005	2.0	2.6	2.4		2.3

* Includes co-generation.
** Transmission and distribution losses and other factors.

Transportation and oil refineries are included under the "Other" category. Electricity use is currently not very great in these sectors and we do not expect to see much increase in the future. The residential sector has the lowest growth potential (2.0%). The largest growth is expected to be seen in the commercial sector (2.6%). Relative to the sizes of the sectors, though, the industrial sector is the largest and is expected to contribute 25.2 TW.h of the total absolute growth of 62.7 TW.h (including co-generation) between 1986 and 2005. The commercial sector's contribution will be 19.9 TW.h while the residential sector is expected to grow by 17.0 TW.h.

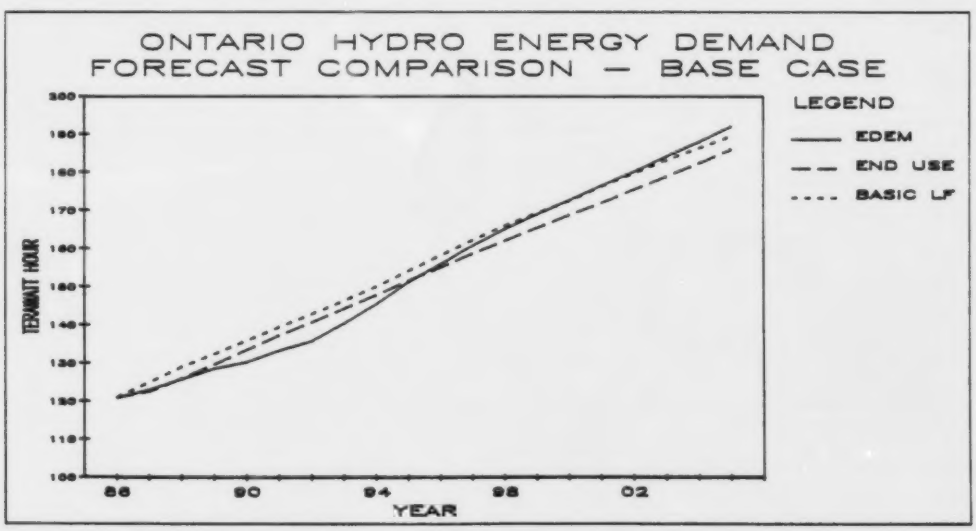
2.3.3 Recommended Forecast

For this year's forecast, the end-use and EDEM models were tuned to figures for demand and economic results of 1986, using the 1986 forecasts as if they were already history. Then a baseline run was made with each model to simulate the most-likely forecast from the September 1986 Annual Economic Outlook. This produced the central forecast for each model which were compared. After this comparison, a decision was made as to what the load forecast should be. Adjustments were then made to each of the models in order to reflect required changes. The models now track the official Basic Load Forecast so that the disaggregation available from the models, as required by certain users, are consistent with the official aggregate forecast.

Summary of Forecasts

Ontario Hydro Basic Energy Demand Model Comparison (TW.h)			Official Load Forecast 861208		
Year	EDEM*	End-Use*	Basic	Indirect Incentives	Primary
1986	121.0	121.0	121.0	0.0	121.0
1990	130.3	133.4	135.9	0.9	135.0
1995	151.1	151.5	154.1	1.8	152.3
2000	172.7	168.8	172.5	5.3	167.2
2005	192.1	186.0	189.5	6.7	182.8
Growth Rates**					
1986-2000	2.6	2.4			2.3
1986-2005	2.5	2.3			2.2

* Not tuned to equal official forecast
** Average annual percent change



2.3.4 Reasonableness Check on the 1986 Recommended Forecast

There are a number of measures that can be used to test the reasonableness of the recommended forecast. Among these are:

(a) Electricity Growth/GNP Growth Ratio

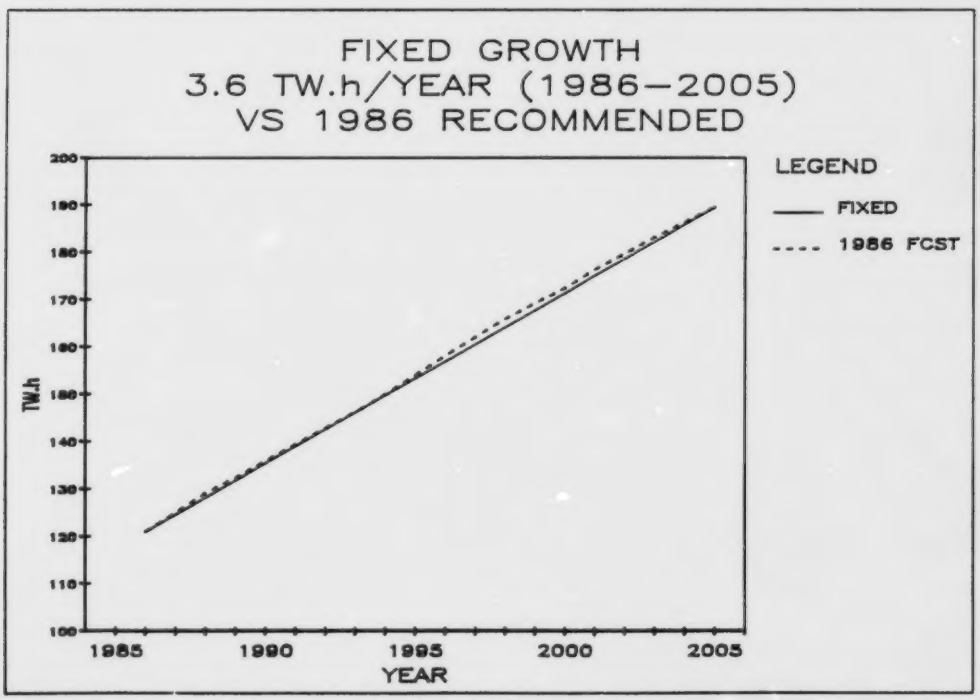
For a conservation-minded society it would be expected that this ratio be less than or equal to 1.0. This ratio indicates the relative growth of electricity compared to growth in provincial output. This ratio is consistently lower than 1.0 for the entire period forecasted.

(b) Long-term Coefficients of Elasticity

These are in line with the results found in an extensive survey of outside literature. Both the elasticities obtained and the survey results were presented to the OEB.

(c) Linear Growth

Linear annual growth assumes a fixed TW.h growth each year. This is in contrast with logarithmic growth which assumes a given percentage increase each year. The graph below shows a comparison of a linear growth forecast between the years 1986 and 2005 and the 1986 Basic Load Forecast. The comparison shows the recommended forecast to be consistent with a linear growth forecast of 3.6 TW.h/year.



2.4 Results for Alternative Scenarios

The Economics and Forecasts Division prepares alternative forecasts of the economic environment in addition to the most-likely forecast on which the recommended load forecast is based. These alternatives are covered by three scenarios, each consisting of a consistent set of assumptions around which a corresponding forecast is prepared. These scenarios are: High Technology and Freer Trade, Higher Inflation and Deflation scenarios.

The wide range of forecasts produced by the EDEM model under the three alternative scenarios gives some idea of the range of uncertainty of the forecast. Each of these forecasts assumes that there is no structural change in the way that energy and electricity is used. The extent to which structural change actually occurs will therefore be an important determinant of the degree to which this forecasted outcome is realized.

It is important to recognize that this uncertainty is as much a part of the load forecast as is the forecast itself. The load forecast represents the most-likely of a wide range of possible forecasts, and planners must take into account the high degree of uncertainty attached to any particular outcome.

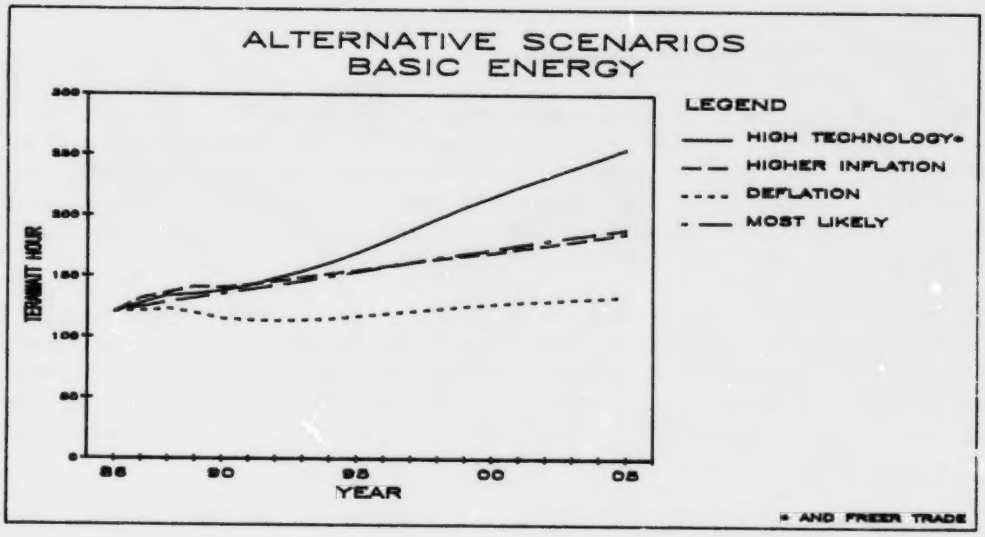
(1) EDEM Results - Alternative Scenarios

Basic Load Forecast

	Residential TW.h			Commercial TW.h			Industrial TW.h			Total Basic Energy TW.h		
	TT	I	D	TT	I	D	TT	I	D	TT	I	D
1986	33.1	33.1	31.1	39.0	39.0	39.0	45.7	45.7	45.7	121.0	121.0	121.0
1990	36.1	37.7	32.1	44.6	45.0	38.7	54.0	54.3	51.2	138.8	141.1	114.9
1995	41.6	41.3	30.9	54.2	49.3	39.6	68.3	59.8	43.9	169.7	155.3	117.4
2000	52.2	43.3	31.4	69.2	55.3	43.2	86.7	65.9	49.5	215.9	170.0	127.6
2005	60.9	45.7	31.1	82.3	60.6	46.2	102.4	73.5	52.9	255.4	186.1	134.0
Growth Rates*												
1986-2000	3.3	1.9	-0.4	4.2	2.5	0.7	4.7	2.6	0.6	4.2	2.5	0.4
1986-2005	3.3	1.7	-0.3	4.0	2.3	0.9	4.3	2.5	0.8	4.0	2.3	0.5

* Average annual per cent change.

TT = High Technology and Freer Trade
I = Higher Inflation
D = Deflation



The high technology and freer trade scenario recognizes that a higher economic growth path than the Most Likely is physically possible, but it would require a different political and institutional climate than we are likely to get. Reducing government deficits would lower real interest rates, and would permit more capital investment to utilize the technological advances of the past decade. Freer trade (not necessarily a full-fledged free trade agreement; in fact, a series of sectoral agreements modelled on the auto pact would be preferable) would allow Canadian industry to operate on a larger scale and therefore increase productivity. There would be some transitional costs in moving to this scenario, and higher growth would not emerge until the 1990s.

The higher inflation scenario recognizes that key elements in the US government have turned against the monetarist doctrine which brought down inflation in the early 1980s. In this scenario, the increasing ascendency of the pro-growth group leads to a blunder in monetary policy which produces significantly higher inflation and resurrects inflationary price setting habits in the economy. It is assumed that there would not be sufficient political resolve to repeat the 1982 recession in order to reduce inflation once again. The increased financial risk in this higher inflation environment would inhibit capital investment and reduce the economic growth rate.

In the deflation scenario, the world-wide glut of basic commodities combines with banking problems and debt repudiations to start a major recession in the late 1980s. This would be abetted by a government monetary policy error in the opposite direction from the one described in the Higher Inflation scenario. Here, monetary policy would be too tight, keeping interest rates high. For Ontario, this would be exacerbated by the fact that the auto industry, whose construction activity has been a major stimulus to the economy in the past few years, will likely be suffering from excess capacity. During this extended depressed period, North American investment and technical progress would languish, enabling the developing countries to narrow further the gap between us and them.

2.5 Impact of Ontario Hydro's Marketing Activities

2.5.1 Introduction

As mentioned earlier, this year two load forecasts are presented. The first, called the Basic Load Forecast, has been discussed in the previous sections of this report. The second, called the Primary Load Forecast, is derived by subtracting from the Basic Load Forecast the net effect of Ontario Hydro incentive programs which could include:

(1) changes in rate structure such as time-of-use, off-peak incentives, etc;

(2) financial incentives such as grants or loans, etc.

These programs are called Ontario Hydro Indirect Incentives. It is the Primary Load Forecast which is to be used for supply planning purposes.

The initial estimates for indirect incentives used to produce the short-term forecast early in 1986 were revised by a Working Group consisting of representatives from Marketing Branch, System Planning Division, and Economics and Forecasts Division. The revised data on indirect incentives are listed below. The resulting forecast is presented in two parts: programs which will result in efficiency improvements, and the effect of introduction of a time-of-use structure for electricity rates.

The forecast does not yet have associated with it an uncertainty range. At best, it can be said to contribute to the total uncertainty in the load forecast.

2.5.2 The Forecast

The Efficiency Improvement programs include both the impact of demonstration projects and the impact of the actual programs themselves, once committed.

(1) December Peak MW Reduction

Year	Efficiency Improvement Programs[1]		Time-of-Use Rates		Total	
	Per Year	Cumulative	Per Year	Cumulative	Per Year	Cumulative
1988*	5	5	0	0	5	5
1989*	10	15	100	100	110	115
1990*	20	35	90	190	110	225
1991*	25	60	60	250	85	310
1992	30	90	185	435	215	525
1993	50	140	165	600	215	740
1994	80	220	125	725	205	945
1995	110	330	100	825	210	1155
1996	130	460	60	885	190	1345
1997	150	610	25	910	175	1520
1998	140	750	25	935	165	1685
1999	130	880	30	965	160	1845
2000	120	1000[1]	35	1000	155	2000
2001	50	1050	35	1035	85	2085
2002	50	1100	30	1065	80	2165
2003	50	1150	25	1090	75	2240
2004	50	1200	25	1115	75	2315
2005	50	1250	25	1140	75	2390

* revised from estimates used in Short-Term Forecast

1. This number is consistent with the low end of the range contained in the Phase I reports of the Demand/Supply Options Study and in the Strategic Marketing Plan.

(2) Annual TW.h Reduction

In order to translate the peak MW reduction caused by efficiency improvement programs into an annual TW.h reduction, estimates of the breakdown of the programs by sector and the load factors of these programs by sector are necessary. The estimate of the breakdown by sector is 1/3 in residential, 5/12 in commercial and 1/4 in industrial. The estimates of the load factors by sector are 34% for the residential sector, 75% for the commercial sector and 75% for the industrial sector. Having determined these estimates, the following annual TW.h reductions are forecast:

Year	TW.h Efficiency Improvement Programs	
	Per Year	Cumulative
1988*	.027	.027
1989*	.054	.081
1990*	.107	.188
1991*	.134	.322
1992	.161	.483
1993	.269	.752
1994	.430	1.182
1995	.891	1.773
1996	.699	2.472
1997	.806	3.278
1998	.752	4.030
1999	.699	4.729
2000	.641	5.370
2001	.269	5.639
2002	.269	5.908
2003	.269	6.177
2004	.269	6.446
2005	.269	6.715

* revised from estimates used in Short-Term Forecast

In the case of time-of-use rates it is assumed that the impact is purely one of load shifting and that there will be no increase or reduction in annual TW.h's.

2.5.3 Policy Assumptions Embedded in the Forecast

(1) Efficiency Improvement Programs

It is assumed there is a corporate commitment to carry out actions along the lines of those contained in a preliminary report on a development plan for strategic conservation. This working paper is illustrative of the resources necessary, although they are not yet fully defined. It involves the cumulative expenditure of a net $1 billion (1985 dollars) by the year 2000. This expenditure includes both manpower and capital costs.

(2) Peak Load Shifting

For this forecast, it is assumed that time-of-use rates are implemented in 1989. These rates will initially be offered to direct customers and municipalities. The equivalent of a 2:1 energy price ratio at the end use level has been determined to be compatible with system planning's estimate of a 1000 MW opportunity on the system for load shifting. It should be stressed that the

1000 MW can only be viewed as an assumption, since there is no guarantee that this level can in actuality be achieved. It has been assumed that these rates will be phased in gradually. If time-of-use rates are not implemented, a reduction in peak of a similar magnitude could be obtained through Control Centre Controlled (CCC) measures.

2.5.4 Considerations for the Preparation of Future Primary Load Forecasts

Demand-side options must be identified along with supply options and evaluated to determine which options have desirable impacts. Plans would then be developed which would include different combinations of demand-side options. Timing and quantity of individual options would be varied in assembling the optimum plan. A balance of the demand- and supply-side programs would result from an integrated planning process.

TABLE A

COMPARISON OF TOTAL SYSTEM DEMANDS WITH EARLIER FORECASTS
ONTARIO PRIMARY DEMAND

20-MINUTE WINTER PEAK DEMAND - Megawatts

		FORECAST MADE IN						
Winter	Actual	1980	1981	1982	1983	1984	1985	1986
1979/80	16365							
1980/81	17189	17476						
1981/82	18124	18188	17461					
1982/83	17578	19051	18012	17953				
1983/84	18896	19955	18768	18650	18227			
1984/85	19390	20724	19449	19370	18819	19438		
1985/86	20668	21464	20204	20042	19404	19915	19846	
1986/87	20609	22242	20943	20730	20035	20531	20386	21222
1987/88		23060	21723	21465	20603	21100	20917	21817
1988/89		23920	22546	22214	21121	21721	21510	22520
1989/90		24826	23424	22987	21636	22198	22116	23065
1990/91		25806	24336	23783	22018	22895	22683	23558
1991/92		26601	25188	24577	22409	23523	23312	23995
1992/93		27410	26065	25385	22851	24116	24029	24364
1993/94		28242	26917	26172	23352	24689	24775	24788
1994/95		29087	27690	26979	23927	25233	25545	25279
1995/96		29954	28393	27760	24545	25859	26029	25766

ANNUAL ENERGY DEMAND - Terawatt hours

		FORECAST MADE IN						
Year	Actual	1980	1981	1982	1983	1984	1985	1986
1979	98.1							
1980	100.2	102.2						
1981	101.7	105.5	102.4					
1982	100.8	110.3	105.7	104.8				
1983	106.1	115.5	109.1	108.1	103.3			
1984	112.3	120.5	113.2	112.5	109.0	111.3		
1985	116.0	124.5	117.4	116.3	112.6	114.5	115.1	
1986	120.6	129.1	121.9	120.1	116.3	117.2	117.7	121.0
1987		133.7	126.4	124.4	119.9	120.7	121.1	125.0
1988		138.9	131.5	129.0	123.5	124.0	124.4	129.0
1989		142.8	136.3	133.2	126.2	127.0	127.4	132.1
1990		148.9	141.6	137.8	129.3	129.8	130.9	135.0
1991		153.5	146.6	142.4	131.6	133.9	134.2	137.9
1992		158.6	152.1	147.9	134.3	137.5	138.0	142.3
1993		163.4	156.7	152.1	136.6	141.0	142.2	145.5
1994		167.9	161.2	156.8	139.6	144.4	146.6	148.8
1995		172.9	165.3	161.4	143.0	147.5	151.2	152.3

TABLE A1

COMPARISON OF 20- MINUTE WINTER PEAK DEMANDS WITH EARLIER FORECASTS

EAST SYSTEM - ONTARIO PRIMARY DEMAND
Megawatts

Winter	Actual	FORECAST MADE IN						
		1980	1981	1982	1983	1984	1985	1986
1979/80	15536							
1980/81	16440	16641						
1981/82	17335	17324	16605					
1982/83	16793	18161	17130	17103				
1983/84	18009	19033	17869	17756	17404			
1984/85	18525	19738	18507	18412	17975	18553		
1985/86	19711	20452	19205	19056	18537	18989	18905	
1986/87	19679	21192	19911	19722	19112	19572	19445	20261
1987/88		21970	20653	20423	19661	20127	19953	20836
1988/89		22789	21432	21133	20155	20738	20506	21541
1989/90		23651	22261	21868	20646	21194	21096	22099
1990/91		24588	23126	22623	21011	21860	21637	22650
1991/92		25346	23936	23370	21384	22459	22237	23209
1992/93		26117	24769	24138	21806	23025	22921	23766
1993/94		26910	25578	24886	22284	23572	23632	24376
1994/95		27715	26312	25653	22833	24091	24367	25042
1995/96		28541	26980	26395	23422	24689	24829	25705

WEST SYSTEM - ONTARIO PRIMARY DEMAND
Megawatts

Winter	Actual	FORECAST MADE IN						
		1980	1981	1982	1983	1984	1985	1986
1979/80	860							
1980/81	875	872						
1981/82	878	888	891					
1982/83	870	914	918	895				
1983/84	932	947	934	943	900			
1984/85	961	1012	980	1002	922	955		
1985/86	1012	1039	1035	1032	948	998	995	
1986/87	1015	1078	1071	1056	1008	1033	995	977
1987/88		1119	1111	1092	1030	1048	1019	1020
1988/89		1162	1156	1133	1056	1060	1062	1054
1989/90		1206	1206	1172	1082	1083	1078	1083
1990/91		1252	1250	1215	1101	1117	1106	1143
1991/92		1290	1293	1260	1120	1148	1136	1180
1992/93		1328	1338	1301	1142	1177	1171	1209
1993/94		1368	1382	1341	1167	1205	1208	1238
1994/95		1409	1421	1382	1196	1232	1245	1270
1995/96		1451	1458	1422	1227	1262	1269	1305

TABLE B

COMPARISON OF 1986 AND 1985 FORECASTS

Average Monthly 1-Hour Peak - Megawatts

1986 Forecast (861208)

	Regional Estimates	Unallocated Load	Sum of Customer Loads	Indirect Incentives	Net Diversity & Loss	Primary Demand
1986	18293	-86	18207	0	-400	17807
1987	19058	-228	18830	0	-413	18417
1988	19777	-372	19405	-13	-425	18967
1989	20548	-541	20007	-51	-469	19487
1990	21281	-701	20580	-128	-510	19942

1985 Forecast (851209)

1986	17958	-109	17849	0	-479	17370
1987	18541	-195	18346	0	-491	17855
1988	19034	-217	18817	0	-505	18312
1989	19564	-238	19326	0	-518	18808
1990	20075	-214	19861	0	-532	19329

Difference between Forecasts (1986 Forecast - 1985 Forecast)

1986	335	23	358	0	79	437
1987	517	-33	484	0	78	562
1988	743	-155	588	-13	80	655
1989	984	-303	681	-51	49	679
1990	1206	-487	719	-128	22	613

TABLE C

LOAD FORECAST REPORT NO 861208
ONTARIO PRIMARY DEMANDS - TOTAL SYSTEMS

Year	20 Min. Annual Peak MW	Annual Energy MW.h	Annual Energy Avg MW	Load Factor %
1945	1,771.3	10,334,944.6	1,179.8	66.6
1946	2,036.1	10,575,379.3	1,207.2	59.3
1947	2,262.2	12,495,821.2	1,426.5	63.1
1948	2,393.0	12,991,064.4	1,478.9	61.8
1949	2,443.7	13,511,035.9	1,542.4	63.1
1950	2,753.1	15,175,583.7	1,732.4	62.9
1951	3,063.1	17,241,303.9	1,968.1	64.3
1952	3,247.7	18,401,371.7	2,094.8	64.5
1953	3,442.8	19,590,139.1	2,236.3	65.0
1954	3,655.7	20,471,343.9	2,336.8	63.9
1955	4,183.2	22,877,271.2	2,611.4	62.4
1956	4,468.5	25,135,134.1	2,861.4	64.0
1957	4,737.6	27,002,762.0	3,082.4	65.1
1958	5,093.1	27,979,394.9	3,193.8	62.7
1959	5,510.6	31,143,172.8	3,555.0	64.5
1960	5,699.8	32,319,968.2	3,679.4	64.6
1961	5,902.9	33,569,282.4	3,831.9	64.9
1962	6,247.0	35,488,962.2	4,051.1	64.9
1963	6,750.6	37,288,964.1	4,256.5	63.1
1964	7,163.9	40,305,468.3	4,588.5	64.1
1965	7,818.4	43,511,759.8	4,967.1	63.5
1966	8,565.6	48,054,384.4	5,485.7	64.0
1967	8,963.8	51,355,505.0	5,862.5	65.4
1968	9,994.4	55,788,374.7	6,351.1	63.5
1969	10,555.4	59,424,443.4	6,783.6	64.3
1970	11,288.7	64,287,605.7	7,338.8	65.0
1971	11,534.5	68,132,582.0	7,777.7	67.4
1972	12,738.8	73,495,941.4	8,367.2	65.7
1973	13,605.4	78,162,478.1	8,922.6	65.6
1974	13,538.1	82,695,005.7	9,440.1	69.7
1975	14,512.5	84,220,853.4	9,614.2	66.2
1976	15,895.3	90,851,705.2	10,343.0	65.1
1977	15,901.1	92,853,681.9	10,599.7	66.7
1978	16,246.7	95,371,714.5	10,887.2	67.0
1979	16,364.7	98,126,082.3	11,201.6	68.4
1980	16,807.8	100,172,734.9	11,404.0	67.8
1981	17,189.0	101,658,168.0	11,604.8	67.5
1982	18,123.6	100,835,597.9	11,510.9	63.5
1983	18,791.5	106,071,164.8	12,108.6	64.4
1984	18,896.0	112,293,482.0	12,783.8	67.6
1985	20,473.0	116,048,994.0	13,247.6	64.7
1986	20,668.0	120,573,918.0	13,764.1	66.6
		LOAD FORECAST ESTIMATE 861208		
1986	20,782.0	120,973,800.0	13,809.8	66.5
1987	21,434.0	125,039,400.0	14,273.9	66.6
1988	22,146.0	129,039,600.0	14,690.3	66.3
1989	22,640.0	132,092,000.0	15,079.0	66.6
1990	23,226.0	135,020,500.0	15,413.3	66.4
1991	23,762.0	137,867,500.0	15,738.3	66.2
1992	24,109.0	142,348,700.0	16,249.8	67.4
1993	24,485.0	145,510,200.0	16,610.8	67.8
1994	24,927.0	148,832,100.0	16,990.0	68.2
1995	25,425.0	152,343,400.0	17,390.8	68.4

1-HR PEAK

REPORT NO. 861208 TABLE 1 - E•W

TOTAL SYSTEM

CUSTOMERS LOADS AND PRIMARY DEMANDS

	MUNICIPAL		RETAIL		DIRECT	
	PEAK	ENERGY	PEAK	ENERGY	PEAK	ENERGY
1986	MW	AV MW	MW	AV MW	MW	AV MW
JAN	13979	10438	3670	2514	2818	2310
FEB	13314	10110	3446	2350	2814	2336
MAR	12813	9622	3185	2107	2825	2309
APR	11886	8693	2835	1820	2833	2309
MAY	11209	8147	2468	1517	2762	2225
JUNE	12060	8382	2225	1438	2742	2202
JULY	12193	8429	2193	1431	2764	2015
AUG	12189	8630	2282	1492	2773	2198
SEPT	12114	8439	2371	1500	2887	2278
OCT	11490	8474	2711	1665	2937	2372
NOV	12980	9491	3105	2014	2959	2424
DEC	13963	10025	3736	2450	2959	2348
1987						
JAN	14404	10756	3800	2604	2955	2417
FEB	13719	10419	3576	2439	2957	2451
MAR	13203	9916	3299	2181	2975	2435
APR	12248	8957	2950	1892	2956	2409
MAY	11549	8392	2561	1572	2855	2294
JUNE	12426	8627	2313	1495	2951	2361
JULY	12562	8677	2281	1488	2934	2136
AUG	12558	8884	2376	1554	2950	2323
SEPT	12481	8689	2458	1553	3006	2367
OCT	11837	8729	2814	1726	3045	2452
NOV	13373	9775	3234	2096	3049	2490
DEC	14388	10327	3876	2541	3041	2408
1988						
JAN						
DEC	14831	10642	4013	2633	3168	2500
DECEMBER						
1989	15260	10947	4158	2727	3165	2500
1990	15675	11242	4295	2816	3197	2528
1991	16022	11486	4424	2900	3258	2566

1-HR PEAK

REPORT NO. 861208 TABLE 1 - E•W

TOTAL SYSTEM

CUSTOMERS LOADS AND PRIMARY DEMANDS

	SUM CUSTOMERS LOADS		DIVERSITY AND/OR LOSSES		PRIMARY DEMAND IN TERMS OF GENERATION		
1986	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW	LOAD FACTOR %
JAN	20466	15263	-146	705	20320	15968	78.6
FEB	19575	14796	-189	685	19386	15481	79.9
MAR	18823	14039	-225	635	18598	14674	78.9
APR	17554	12822	-403	574	17151	13396	78.1
MAY	16439	11889	-509	557	15930	12446	78.1
JUNE	17026	12022	-620	535	16406	12557	76.5
JULY	17150	11874	-603	594	16547	12468	75.3
AUG	17244	12320	-532	580	16712	12900	77.2
SEPT	17372	12218	-825	574	16547	12792	77.3
OCT	17137	12511	-593	557	16544	13068	79.0
NOV	19045	13929	-111	614	18934	14543	76.8
DEC	20658	14823	-48	701	20610	15524	75.3
1987							
JAN	21159	15777	-149	726	21010	16503	78.5
FEB	20252	15309	-191	706	20061	16015	79.8
MAR	19476	14533	-230	655	19246	15188	78.9
APR	18154	13258	-416	593	17738	13851	78.1
MAY	16965	12258	-525	577	16440	12835	78.1
JUNE	17691	12483	-645	557	17046	13040	76.5
JULY	17778	12301	-624	617	17154	12918	75.3
AUG	17884	12761	-552	602	17332	13363	77.1
SEPT	17944	12609	-850	595	17094	13204	77.2
OCT	17695	12907	-610	573	17085	13480	78.9
NOV	19655	14362	-113	633	19542	14995	76.7
DEC	21304	15276	-48	723	21256	15999	75.3
1988							
JAN					21598	16953	78.5
DEC	22012	15775	-50	747	21962	16522	75.2
DECEMBER							
1989	22582	16174	-131	693	22451	16867	75.1
1990	23168	16586	-137	712	23031	17298	75.1
1991	23704	16952	-140	730	23564	17682	75.0
1992					23903	18254	76.4
1993					24274	18652	76.8
1994					24711	19066	77.2
1995					25203	19507	77.4

20-MIN PEAK

REPORT NO. 861208 TABLE 1 - E+W

TOTAL SYSTEM

CUSTOMERS LOADS AND PRIMARY DEMANDS

	SUM CUSTOMERS LOADS		DIVERSITY AND/OR LOSSES		PRIMARY DEMAND IN TERMS OF GENERATION		LOAD FACTOR
1986	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW	%
JAN	20674	15263	-149	705	20525	15968	77.8
FEB	19735	14796	-189	685	19546	15481	79.2
MAR	18962	14039	-225	635	18737	14674	78.3
APR	17697	12822	-406	574	17291	13396	77.5
MAY	16581	11889	-514	557	16067	12446	77.5
JUNE	17165	12022	-628	535	16537	12557	75.9
JULY	17267	11874	-607	594	16660	12468	74.8
AUG	17367	12320	-535	580	16832	12900	76.6
SEPT	17515	12218	-832	574	16683	12792	76.7
OCT	17306	12511	-598	557	16708	13068	78.2
NOV	19222	13929	-112	614	19110	14543	76.1
DEC	20830	14823	-48	701	20782	15524	74.7
1987							
JAN	21373	15777	-151	726	21222	16503	77.8
FEB	20416	15309	-191	706	20225	16015	79.2
MAR	19618	14533	-231	655	19387	15188	78.3
APR	18300	13258	-418	593	17882	13851	77.5
MAY	17111	12258	-530	577	16581	12835	77.4
JUNE	17832	12483	-651	557	17181	13040	75.9
JULY	17898	12301	-628	617	17270	12918	74.8
AUG	18010	12761	-554	602	17456	13363	76.6
SEPT	18090	12609	-857	595	17233	13204	76.6
OCT	17868	12907	-615	573	17253	13480	78.1
NOV	19837	14362	-113	633	19724	14995	76.0
DEC	21482	15276	-48	723	21434	15999	74.6
1988							
JAN					21817	16952	77.7
DEC	22194	15775	-48	747	22146	16522	74.6
DECEMBER							
1989	22769	16174	-129	693	22640	16867	74.5
1990	23358	16586	-132	712	23226	17298	74.5
1991	23897	16952	-135	730	23762	17682	74.4
1992					24109	18254	75.7
1993					24485	18652	76.2
1994					24927	19066	76.5
1995					25425	19507	76.7

1-HR PEAK

REPORT NO. 861208

TABLE 1 - ES

EAST SYSTEM

ONTARIO PRIMARY DEMAND

25 AND 60 HERTZ

1986	EAST SYSTEM 60 HERTZ PEAK MW	EAST SYSTEM 60 HERTZ ENERGY AV MW	NIAGARA 25 HERTZ PEAK MW	NIAGARA 25 HERTZ ENERGY AV MW	NORTHEASTERN 25 HERTZ PEAK MW	NORTHEASTERN 25 HERTZ ENERGY AV MW	INTER-NETWORK DIVER-SITY	EAST SYSTEM TOTAL PEAK MW	EAST SYSTEM PRIMARY ENERGY AV MW
JAN	19284	15040	82	57	39	27	-30	19375	15124
FEB	18399	14574	82	57	38	27	-30	18489	14658
MAR	17636	13831	82	57	38	27	-30	17726	13915
APR	16277	12581	83	57	38	27	-30	16368	12665
MAY	15075	11666	83	57	38	27	-30	15166	11750
JUNE	15568	11770	82	57	38	26	-30	15658	11853
JULY	15710	11704	82	56	38	26	-30	15800	11786
AUG	15878	12119	82	57	37	25	-30	15967	12201
SEPT	15679	11995	83	55	38	26	-30	15770	12076
OCT	15635	12241	82	57	38	26	-30	15725	12324
NOV	17962	13659	82	57	38	27	-30	18052	13743
DEC	19570	14607	82	56	38	26	-30	19660	14689
1987									
JAN	19966	15565	82	57	37	26	-30	20055	15648
FEB	19077	15101	82	57	37	26	-30	19166	15184
MAR	18274	14323	82	57	37	26	-30	18363	14406
APR	16848	13020	83	57	37	26	-30	16938	13103
MAY	15574	12041	83	57	37	26	-30	15664	12124
JUNE	16191	12233	83	57	36	25	-30	16280	12315
JULY	16284	12129	98	65	36	25	-30	16388	12219
AUG	16466	12559	98	65	36	23	-30	16570	12647
SEPT	16202	12392	98	64	36	25	-30	16306	12481
OCT	16143	12630	98	66	36	25	-30	16247	12721
NOV	18539	14086	98	66	36	26	-30	18643	14178
DEC	20180	15054	98	66	36	25	-30	20284	15145
1988									
JAN	20516	15985	98	67	37	26	-30	20621	16078
DEC	20862	15553	98	66	34	25	-30	20964	15644
DECEMBER									
1989	21336	15887	96	65	33	23	-30	21435	15975
1990	21862	16269	96	65	33	23	-30	21961	16357
1991	22367	16629	96	65	33	23	-30	22466	16717
1992	22706	17160	98	65	33	23	-30	22807	17248
1993	23058	17536	98	65	33	23	-30	23159	17624
1994	23472	17927	98	65	33	23	-30	23573	18015
1995	23934	18342	98	65	37	23	-30	24039	18430

20-MIN PEAK

REPORT NO. 861208

TABLE 1 - ES

EAST SYSTEM

ONTARIO PRIMARY DEMAND

25 AND 60 HERTZ

	EAST SYSTEM 60 HERTZ		NIAGARA 25 HERTZ		NORTHEASTERN 25 HERTZ		INTER-NETWORK	EAST TOTAL	SYSTEM PRIMARY
	PEAK	ENERGY	PEAK	ENERGY	PEAK	ENERGY	DIVER-	PEAK	ENERGY
1986	MW	AV MW	MW	AV MW	MW	AV MW	SITY	MW	AV MW
JAN	19482	15040	83	57	39	27	-30	19574	15124
FEB	18553	14574	83	57	38	27	-30	18644	14658
MAR	17770	13831	82	57	38	27	-30	17860	13915
APR	16412	12581	83	57	38	27	-30	16503	12665
MAY	15208	11666	83	57	38	27	-30	15299	11750
JUNE	15696	11770	83	57	38	26	-30	15787	11853
JULY	15820	11704	82	56	38	26	-30	15910	11786
AUG	15993	12119	83	57	37	25	-30	16083	12201
SEPT	15809	11995	83	55	38	26	-30	15900	12076
OCT	15794	12241	83	57	38	26	-30	15885	12324
NOV	18133	13659	83	57	38	27	-30	18224	13743
DEC	19737	14607	83	56	38	26	-30	19828	14689
1987									
JAN	20171	15565	83	57	37	26	-30	20261	15648
FEB	19235	15101	83	57	37	26	-30	19325	15184
MAR	18412	14323	82	57	37	26	-30	18501	14406
APR	16987	13020	83	57	37	26	-30	17077	13103
MAY	15710	12041	83	57	37	26	-30	15800	12124
JUNE	16323	12233	83	57	36	25	-30	16412	12315
JULY	16397	12129	99	65	36	25	-30	16502	12219
AUG	16585	12559	99	65	36	23	-30	16690	12647
SEPT	16336	12392	99	64	36	25	-30	16441	12481
OCT	16307	12630	98	66	36	25	-30	16411	12721
NOV	18717	14086	98	66	36	26	-30	18821	14178
DEC	20353	15054	98	66	36	25	-30	20457	15145
1988									
JAN	20730	15985	98	67	36	26	-30	20834	16078
DEC	21040	15553	98	66	34	25	-30	21142	15644
DECEMBER									
1989	21518	15887	98	65	33	23	-30	21619	15975
1990	22048	16269	98	65	33	23	-30	22149	16357
1991	22558	16629	98	65	33	23	-30	22659	16717
1992	22906	17160	98	65	33	23	-30	23007	17248
1993	23262	17536	98	65	33	23	-30	23363	17624
1994	23682	17927	98	65	33	23	-30	23783	18015
1995	24149	18342	98	65	37	23	-30	24254	18430

1-HR PEAK

REPORT NO. 861208 TABLE 2 - ES

EAST SYSTEM

CUSTOMERS LOADS AND PRIMARY DEMANDS

	MUNICIPAL		RETAIL		DIRECT	
	PEAK	ENERGY	PEAK	ENERGY	PEAK	ENERGY
1986	MW	AV MW	MW	AV MW	MW	AV MW
JAN	13671	10217	3486	2382	2304	1872
FEB	13014	9903	3273	2230	2299	1879
MAR	12548	9440	3028	1999	2313	1881
APR	11651	8530	2700	1733	2331	1871
MAY	10988	7991	2338	1436	2262	1799
JUNE	11854	8233	2107	1364	2238	1758
JULY	11991	8287	2086	1360	2257	1581
AUG	11986	8489	2170	1420	2266	1754
SEPT	11895	8291	2243	1421	2379	1837
OCT	11256	8308	2571	1576	2431	1929
NOV	12703	9295	2941	1904	2452	1968
DEC	13646	9796	3545	2315	2452	1923
1987						
JAN	14088	10530	3609	2466	2446	1978
FEB	13413	10208	3396	2314	2456	1995
MAR	12931	9729	3136	2069	2465	1994
APR	12007	8790	2809	1802	2446	1960
MAY	11323	8231	2426	1488	2351	1862
JUNE	12216	8475	2191	1417	2435	1903
JULY	12356	8531	2171	1416	2415	1691
AUG	12351	8739	2261	1479	2431	1870
SEPT	12257	8537	2326	1473	2497	1925
OCT	11598	8559	2670	1634	2529	2001
NOV	13091	9575	3063	1982	2534	2027
DEC	14061	10090	3677	2401	2527	1977
1988						
JAN						
DEC	14495	10399	3807	2488	2642	2058
DECEMBER						
1989	14915	10697	3943	2576	2638	2057
1990	15323	10986	4072	2659	2628	2051
1991	15661	11225	4194	2738	2675	2077

1-HR PEAK

REPORT NO. 861208 TABLE 2 - ES

EAST SYSTEM

CUSTOMERS LOADS AND PRIMARY DEMANDS

	SUM CUSTOMERS LOADS		DIVERSITY AND/OR LOSSES		PRIMARY DEMAND IN TERMS OF GENERATION		LOAD FACTOR
	PEAK	ENERGY	PEAK	ENERGY	PEAK	ENERGY	
1986	MW	AV MW	MW	AV MW	MW	AV MW	%
JAN	19461	14470	-86	654	19375	15124	78.1
FEB	18585	14012	-96	646	18489	14658	79.3
MAR	17889	13320	-163	595	17726	13915	78.5
APR	16682	12133	-314	532	16368	12665	77.4
MAY	15588	11226	-422	524	15166	11750	77.5
JUNE	16199	11354	-541	499	15658	11853	75.7
JULY	16334	11228	-534	558	15800	11786	74.6
AUG	16423	11662	-456	539	15967	12201	76.4
SEPT	16518	11549	-748	527	15770	12076	76.6
OCT	16258	11813	-533	511	15725	12324	78.4
NOV	18096	13167	-44	576	18052	13743	76.1
DEC	19642	14034	18	655	19660	14689	74.7
1987							
JAN	20144	14974	-89	674	20055	15648	78.0
FEB	19265	14517	-99	667	19166	15184	79.2
MAR	18532	13792	-169	614	18363	14406	78.5
APR	17263	12552	-325	551	16938	13103	77.4
MAY	16100	11582	-436	542	15664	12124	77.4
JUNE	16842	11796	-562	519	16280	12315	75.6
JULY	16942	11638	-554	581	16388	12219	74.6
AUG	17043	12089	-473	558	16570	12647	76.3
SEPT	17080	11934	-774	547	16306	12481	76.5
OCT	16797	12194	-550	527	16247	12721	78.3
NOV	18688	13584	-45	594	18643	14178	76.0
DEC	20265	14468	19	677	20284	15145	74.7
1988							
JAN					20621	16078	78.0
DEC	20943	14945	21	699	20964	15644	74.6
DECEMBER							
1989	21496	15330	-61	645	21435	15975	74.5
1990	22022	15696	-61	661	21961	16357	74.5
1991	22530	16040	-64	677	22466	16717	74.4
1992					22807	17248	75.6
1993					23159	17624	76.1
1994					23573	18015	76.4
1995					24039	18430	76.7

1-HR PEAK

REPORT NO. 861208

TABLE 3 - ES

EAST SYSTEM

60 HERTZ NETWORK

	SUM CUSTOMERS LOADS		DIVERSITY AND/OR LOSSES		PRIMARY DEMAND IN TERMS OF GENERATION		LOAD FACTOR
1986	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW	%
JAN	19362	14405	-78	635	19284	15040	78.0
FEB	18487	13946	-88	628	18399	14574	79.2
MAR	17791	13255	-155	576	17636	13831	78.4
APR	16583	12068	-306	513	16277	12581	77.3
MAY	15490	11161	-415	505	15075	11666	77.4
JUNE	16101	11291	-533	479	15568	11770	75.6
JULY	16236	11165	-526	539	15710	11704	74.5
AUG	16326	11600	-448	519	15878	12119	76.3
SEPT	16420	11488	-741	507	15679	11995	76.5
OCT	16161	11749	-526	492	15635	12241	78.3
NOV	17998	13102	-36	557	17962	13659	76.0
DEC	19544	13970	26	637	19570	14607	74.6
1987							
JAN	20046	14909	-80	656	19966	15565	78.0
FEB	19168	14452	-91	649	19077	15101	79.2
MAR	18435	13727	-161	596	18274	14323	78.4
APR	17165	12488	-317	532	16848	13020	77.3
MAY	16002	11517	-428	524	15574	12041	77.3
JUNE	16745	11733	-554	500	16191	12233	75.6
JULY	16833	11569	-549	560	16284	12129	74.5
AUG	16934	12020	-468	539	16466	12559	76.3
SEPT	16971	11866	-769	526	16202	12392	76.5
OCT	16688	12123	-545	507	16143	12630	78.2
NOV	18579	13514	-40	572	18539	14086	76.0
DEC	20156	14399	24	655	20180	15054	74.6
1988							
JAN					20516	15985	77.9
DEC	20836	14876	26	677	20862	15553	74.6
DECEMBER							
1989	21390	15262	-54	625	21336	15887	74.5
1990	21916	15628	-54	641	21862	16269	74.4
1991	22424	15972	-57	657	22367	16629	74.3
1992					22766	17160	75.6
1993					23058	17536	76.1
1994					23472	17927	76.4
1995					23934	18342	76.6

1-HR PEAK

REPORT NO. 861208 TABLE 4 - ES

EAST SYSTEM - NIAGARA

25 HERTZ NETWORK

	SUM CUSTOMERS LOADS		DIVERSITY AND/OR LOSSES		PRIMARY DEMAND IN TERMS OF GENERATION		
	PEAK	ENERGY	PEAK	ENERGY	PEAK	ENERGY	LOAD FACTOR
1986	MW	AV MW	MW	AV MW	MW	AV MW	Z
JAN	66	44	16	13	82	57	69.5
FEB	66	44	16	13	82	57	69.5
MAR	66	44	16	13	82	57	69.5
APR	67	44	16	13	83	57	68.7
MAY	67	44	16	13	83	57	68.7
JUNE	66	44	16	13	82	57	69.5
JULY	66	43	16	13	82	56	68.3
AUG	66	44	16	13	82	57	69.5
SEPT	67	42	16	13	83	55	66.3
OCT	66	44	16	13	82	57	69.5
NOV	66	44	16	13	82	57	69.5
DEC	66	43	16	13	82	56	68.3
1987							
JAN	66	44	16	13	82	57	69.5
FEB	66	44	16	13	82	57	69.5
MAR	66	44	16	13	82	57	69.5
APR	67	44	16	13	83	57	68.7
MAY	67	44	16	13	83	57	68.7
JUNE	67	44	16	13	83	57	68.7
JULY	79	50	19	15	98	65	66.3
AUG	79	50	19	15	98	65	66.3
SEPT	79	49	19	15	98	64	65.3
OCT	79	51	19	15	98	66	67.3
NOV	79	51	19	15	98	66	67.3
DEC	79	51	19	15	98	66	67.3
1988							
JAN					98	67	68.4
DEC	79	51	19	15	98	66	67.3
DECEMBER							
1989	78	50	18	15	96	65	67.7
1990	78	50	18	15	96	65	67.7
1991	78	50	18	15	96	65	67.7
1992					98	65	66.3
1993					98	65	66.3
1994					98	65	66.3
1995					98	65	66.3

1-HR PEAK

REPORT NO. 861208 TABLE 5 - ES

EAST SYSTEM -NORTHEASTERN REGION

25 HERTZ NETWORK

	SUM CUSTOMERS LOADS		DIVERSITY AND/OR LOSSES		PRIMARY DEMAND IN TERMS OF GENERATION		LOAD FACTOR
1986	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW	%
JAN	33	21	6	6	39	27	69.2
FEB	32	21	6	6	38	27	71.1
MAR	32	21	6	6	38	27	71.1
APR	32	21	6	6	38	27	71.1
MAY	32	21	6	6	38	27	71.1
JUNE	32	20	6	6	38	26	68.4
JULY	32	20	6	6	38	26	68.4
AUG	31	19	6	6	37	25	67.6
SEPT	32	20	6	6	38	26	68.4
OCT	32	20	6	6	38	26	68.4
NOV	32	21	6	6	38	27	71.1
DEC	32	20	6	6	38	26	68.4
1987							
JAN	31	20	6	6	37	26	70.3
FEB	31	20	6	6	37	26	70.3
MAR	31	20	6	6	37	26	70.3
APR	31	20	6	6	37	26	70.3
MAY	31	20	6	6	37	26	70.3
JUNE	30	19	6	6	36	25	69.4
JULY	30	19	6	6	36	25	69.4
AUG	30	18	6	5	36	23	63.9
SEPT	30	19	6	6	36	25	69.4
OCT	30	19	6	6	36	25	69.4
NOV	30	20	6	6	36	26	72.2
DEC	30	19	6	6	36	25	69.4
1988							
JAN					37	26	70.3
DEC	29	19	5	6	34	25	73.5
DECEMBER							
1989	28	18	5	5	33	23	69.7
1990	28	18	5	5	33	23	69.7
1991	28	18	5	5	33	23	69.7
1992					33	23	69.7
1993					33	23	69.7
1994					33	23	69.7
1995					37	23	62.2

1-HR PEAK

REPORT NO. 861208 TABLE 6 - ES

EAST SYSTEM

SUM OF CUSTOMERS LOADS BY REGION

	CENTRAL		WESTERN		EASTERN	
	PEAK	ENERGY	PEAK	ENERGY	PEAK	ENERGY
1986	MW	AV MW	MW	AV MW	MW	AV MW
JAN	9407	7032	3947	2965	2966	2113
FEB	8988	6842	3777	2902	2795	2000
MAR	8678	6551	3681	2783	2627	1842
APR	8095	5970	3566	2618	2374	1639
MAY	7626	5580	3393	2513	2164	1473
JUNE	8264	5773	3644	2578	2109	1449
JULY	8368	5778	3642	2574	2118	1439
AUG	8349	5923	3717	2677	2144	1469
SEPT	8357	5842	3679	2575	2138	1470
OCT	7922	5844	3512	2595	2248	1551
NOV	8867	6502	3798	2818	2606	1796
DEC	9450	6806	4001	2893	2983	2032
1987						
JAN	9774	7301	4072	3061	3066	2185
FEB	9342	7106	3905	2999	2895	2069
MAR	9022	6804	3790	2868	2729	1912
APR	8420	6204	3655	2681	2438	1684
MAY	7956	5813	3469	2568	2221	1512
JUNE	8612	6005	3769	2666	2173	1494
JULY	8717	6007	3777	2669	2186	1485
AUG	8703	6163	3860	2779	2212	1515
SEPT	8644	6035	3826	2680	2209	1518
OCT	8196	6041	3636	2686	2321	1601
NOV	9165	6714	3923	2908	2705	1861
DEC	9765	7029	4130	2983	3081	2097
DECEMBER						
1988	10132	7289	4246	3067	3194	2171
1989	10435	7504	4338	3129	3282	2230
1990	10731	7714	4415	3183	3368	2286
1991	10965	7879	4491	3236	3445	2336

1-HR PEAK

REPORT NO. 861208

TABLE 6 - ES

EAST SYSTEM

SUM OF CUSTOMERS LOADS BY REGION

1986	GEORGIAN BAY PEAK MW	GEORGIAN BAY ENERGY AV MW	NORTHEASTERN PEAK MW	NORTHEASTERN ENERGY AV MW	TOTAL PEAK MW	TOTAL ENERGY AV MW
JAN	1346	945	1795	1414	19461	14470
FEB	1282	892	1743	1377	18585	14012
MAR	1193	813	1710	1330	17889	13320
APR	1069	697	1578	1209	16682	12133
MAY	964	590	1440	1071	15588	11226
JUNE	836	546	1346	1008	16199	11354
JULY	882	581	1324	855	16334	11228
AUG	891	599	1323	995	16423	11662
SEPT	924	599	1419	1063	16518	11549
OCT	1053	660	1524	1162	16258	11813
NOV	1148	780	1676	1271	18096	13167
DEC	1356	912	1852	1391	19642	14034
1987						
JAN	1404	988	1828	1439	20144	14974
FEB	1337	932	1787	1410	19265	14517
MAR	1247	853	1743	1354	18532	13792
APR	1131	744	1618	1240	17263	12552
MAY	985	599	1469	1090	16100	11582
JUNE	913	603	1375	1029	16842	11796
JULY	916	605	1345	871	16942	11638
AUG	924	622	1344	1009	17043	12089
SEPT	958	621	1443	1080	17080	11934
OCT	1090	684	1553	1183	16797	12194
NOV	1190	809	1705	1292	18688	13584
DEC	1404	944	1885	1415	20265	14468
DECEMBER						
1988	1450	975	1922	1443	20943	14945
1989	1495	1006	1946	1460	21496	15330
1990	1537	1033	1973	1480	22022	15696
1991	1576	1059	2054	1530	22530	16040

1-HR PEAK

REPORT NO. 861208 TABLE 1 - WS

WEST SYSTEM

CUSTOMERS LOADS AND PRIMARY DEMANDS

	MUNICIPAL		RETAIL		DIRECT	
1986	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW	PEAK MW	ENERGY AV MW
JAN	308	221	184	132	514	439
FEB	301	207	174	120	515	457
MAR	266	183	157	108	511	428
APR	235	163	135	87	501	439
MAY	221	157	130	81	500	426
JUNE	206	149	118	75	504	444
JULY	202	142	107	70	506	433
AUG	202	141	111	73	507	444
SEPT	219	149	128	78	508	442
OCT	233	166	139	89	506	443
NOV	277	196	164	110	507	456
DEC	317	229	191	134	507	425
1987						
JAN	316	227	191	138	509	439
FEB	306	211	180	125	501	457
MAR	272	187	163	112	509	442
APR	241	167	140	90	511	449
MAY	227	161	134	83	504	432
JUNE	210	152	122	77	516	457
JULY	207	146	110	72	519	445
AUG	207	144	114	75	519	453
SEPT	224	152	132	81	508	442
OCT	239	170	144	92	516	451
NOV	282	208	170	114	515	464
DEC	327	236	199	140	514	431
1988						
JAN						
DEC	336	243	207	145	526	442
DECEMBER						
1989	344	249	215	151	527	443
1990	353	255	223	157	569	477
1991	361	262	230	162	582	489

1-HR PEAK

REPORT NO. 861208 TABLE 1 - WS

WEST SYSTEM

CUSTOMERS LOADS AND PRIMARY DEMANDS

	SUM CUSTOMERS LOADS		DIVERSITY AND/OR LOSSES		PRIMARY DEMAND IN TERMS OF GENERATION		LOAD FACTOR
	PEAK	ENERGY	PEAK	ENERGY	PEAK	ENERGY	
1986	MW	AV MW	MW	AV MW	MW	AV MW	%
JAN	1006	792	-27	51	979	843	86.1
FEB	989	784	-24	39	965	823	85.3
MAR	934	719	-22	40	912	759	83.2
APR	872	689	-26	41	846	730	86.3
MAY	851	663	-38	33	813	696	85.6
JUNE	828	668	-37	37	791	705	89.1
JULY	815	646	-21	36	794	682	85.9
AUG	821	657	-21	43	800	700	87.5
SEPT	854	669	15	47	869	716	82.4
OCT	878	698	-17	45	861	743	86.3
NOV	948	762	-31	38	917	800	87.2
DEC	1015	789	-24	46	991	835	84.3
1987							
JAN	1016	804	-27	51	989	855	86.5
FEB	987	792	-24	40	963	832	86.4
MAR	945	741	-22	41	923	782	84.7
APR	891	706	-27	42	864	748	86.6
MAY	865	676	-38	35	827	711	86.0
JUNE	849	687	-38	38	811	725	89.4
JULY	836	663	-21	36	815	699	85.8
AUG	840	672	-22	44	818	716	87.5
SEPT	864	675	15	47	879	722	82.1
OCT	899	713	-17	46	882	759	86.1
NOV	967	778	-31	39	936	817	87.3
DEC	1039	808	-24	46	1015	854	84.1
1988							
JAN					1011	874	86.4
DEC	1068	830	-25	48	1043	878	84.2
DECEMBER							
1989	1086	844	-26	48	1060	892	84.2
1990	1145	890	-27	51	1118	941	84.2
1991	1174	913	-28	52	1146	965	84.2
1992					1146	1006	87.8
1993					1167	1029	88.2
1994					1190	1052	88.4
1995					1218	1076	88.3

20-MIN PEAK

REPORT NO. 861208 TABLE 1 - WS

WEST SYSTEM

CUSTOMERS LOADS AND PRIMARY DEMANDS

	SUM CUSTOMERS LOADS		DIVERSITY AND/OR LOSSES		PRIMARY DEMAND IN TERMS OF GENERATION		LOAD FACTOR
	PEAK	ENERGY	PEAK	ENERGY	PEAK	ENERGY	
1986	MW	AV MW	MW	AV MW	MW	AV MW	%
JAN	1012	792	-27	51	985	843	85.6
FEB	994	784	-24	39	970	823	84.8
MAR	938	719	-22	40	916	759	82.9
APR	877	689	-26	41	851	730	85.8
MAY	856	663	-38	33	818	696	85.1
JUNE	831	668	-37	37	794	705	88.8
JULY	819	646	-21	36	798	682	85.5
AUG	825	657	-21	43	804	700	87.1
SEPT	859	669	15	47	874	716	81.9
OCT	883	698	-17	45	866	743	85.8
NOV	953	762	-31	38	922	800	86.8
DEC	1021	789	-24	46	997	835	83.8
1987							
JAN	1022	804	-27	51	995	855	85.9
FEB	992	792	-24	40	968	832	86.0
MAR	949	741	-22	41	927	782	84.4
APR	896	706	-27	42	869	748	86.1
MAY	870	676	-38	35	832	711	85.5
JUNE	852	687	-38	38	814	725	89.1
JULY	839	663	-21	36	818	699	85.5
AUG	845	672	-22	44	823	716	87.0
SEPT	869	675	16	47	885	722	81.6
OCT	903	713	-17	46	886	759	85.7
NOV	972	778	-32	39	940	817	86.9
DEC	1045	808	-25	46	1020	854	83.7
1988							
JAN					1018	874	85.9
DEC	1074	830	-25	48	1049	878	83.7
DECEMBER							
1989	1092	844	-26	48	1066	892	83.7
1990	1152	890	-27	51	1125	941	83.6
1991	1180	913	-28	52	1152	965	83.8
1992					1153	1006	87.3
1993					1174	1029	87.6
1994					1198	1052	87.8
1995					1226	1076	87.8

TOTAL SYSTEM ONTARIO PRIMARY DEMANDS
BASED ON LOAD FORECAST REPORT NO. 861208

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGE OR TOTAL
1986													
20 MIN PEAK MW	20525.	19546.	18737.	17291.	16067.	16537.	16660.	16832.	16683.	16708.	19110.	20782.	17956.5
1 HOUR PEAK MW	20320.	19386.	18598.	17151.	15930.	16406.	16548.	16712.	16548.	16544.	18934.	20610.	17807.2
ENERGY GWH	11880.	10403.	10917.	9645.	9260.	9041.	9276.	9598.	9210.	9723.	10471.	11550.	120973.8
ENERGY AV MW	15968.	15481.	14674.	13396.	12446.	12557.	12468.	12900.	12792.	13068.	14543.	15524.	13809.8
*L.F. %	78.6	79.9	78.9	78.1	78.1	76.5	75.3	77.2	77.3	79.0	76.8	75.3	77.6
1987													
20 MIN PEAK MW	21222.	20225.	19387.	17882.	16581.	17181.	17270.	17456.	17233.	17253.	19724.	21434.	18570.7
1 HOUR PEAK MW	21010.	20061.	19246.	17738.	16440.	17046.	17154.	17332.	17094.	17085.	19542.	21256.	18417.0
ENERGY GWH	12278.	10762.	11300.	9973.	9549.	9389.	9611.	9942.	9507.	10029.	10796.	11903.	125039.4
ENERGY AV MW	16503.	16015.	15188.	13851.	12835.	13040.	12918.	13363.	13204.	13480.	14995.	15999.	14273.9
*L.F. %	78.5	79.8	78.9	78.1	78.1	76.5	75.3	77.1	77.2	78.9	76.7	75.3	77.5
1988													
20 MIN PEAK MW	21817.	20791.	19933.	18425.	17164.	17682.	17772.	17988.	17735.	17758.	20294.	22146.	19125.4
1 HOUR PEAK MW	21598.	20623.	19786.	18277.	17018.	17542.	17653.	17860.	17591.	17584.	20107.	21962.	18966.8
ENERGY GWH	12613.	11449.	11606.	10265.	9881.	9648.	9875.	10231.	9773.	10310.	11096.	12292.	129039.6
ENERGY AV MW	16953.	16450.	15600.	14257.	13281.	13400.	13273.	13751.	13573.	13858.	15411.	16522.	14690.3
*L.F. %	78.5	79.8	78.8	78.0	78.0	76.4	75.2	77.0	77.2	78.8	76.6	75.2	77.5
1989													
20 MIN PEAK MW	22520.	21451.	20555.	18988.	17675.	18198.	18221.	18431.	18169.	18176.	20777.	22640.	19650.0
1 HOUR PEAK MW	22293.	21278.	20404.	18835.	17524.	18054.	18098.	18301.	18023.	17997.	20585.	22451.	19487.0
ENERGY GWH	13018.	11404.	11966.	10578.	10175.	9928.	10097.	10470.	10009.	10560.	11341.	12549.	132092.0
ENERGY AV MW	17497.	16970.	16084.	14691.	13676.	13789.	13571.	14072.	13901.	14193.	15751.	16867.	15079.0
*L.F. %	78.5	79.8	78.8	78.0	78.0	76.4	75.0	76.9	77.1	78.9	76.5	75.1	77.4
1990													
20 MIN PEAK MW	23065.	21958.	21028.	19411.	18033.	18575.	18661.	18870.	18592.	18602.	21282.	23226.	20108.5
1 HOUR PEAK MW	22832.	21780.	20872.	19255.	17880.	18428.	18537.	18737.	18442.	18420.	21086.	23031.	19941.7
ENERGY GWH	13324.	11638.	12214.	10791.	10365.	10121.	10336.	10714.	10235.	10802.	11610.	12870.	135020.5
ENERGY AV MW	17909.	17318.	16417.	14987.	13931.	14057.	13893.	14401.	14215.	14519.	16125.	17298.	15413.3
*L.F. %	78.4	79.5	78.7	77.8	77.9	76.3	74.9	76.9	77.1	78.8	76.5	75.1	77.3
1991													
20 MIN PEAK MW	23558.	22421.	21469.	19821.	18399.	18963.	19056.	19272.	18992.	19011.	21757.	23762.	20540.0
1 HOUR PEAK MW	23319.	22239.	21311.	19662.	18242.	18814.	18929.	19136.	18839.	18825.	21556.	23564.	20369.7
ENERGY GWH	13608.	11876.	12467.	11017.	10571.	10322.	10550.	10943.	10449.	11036.	11866.	13155.	137867.5
ENERGY AV MW	18290.	17672.	16757.	15302.	14209.	14336.	14180.	14709.	14512.	14833.	16481.	17682.	15738.3
*L.F. %	78.4	79.5	78.6	77.8	77.9	76.2	74.9	76.9	77.0	78.8	76.5	75.0	77.3
1992													
20 MIN PEAK MW	23995.	22820.	21836.	20137.	18698.	19267.	19353.	19565.	19270.	19257.	22059.	24109.	20864.1
1 HOUR PEAK MW	23750.	22634.	21674.	19971.	18536.	19113.	19220.	19427.	19112.	19062.	21851.	23903.	20687.8
ENERGY GWH	14014.	12234.	12844.	11369.	10925.	10667.	10917.	11324.	10809.	11416.	12249.	13581.	142348.7
ENERGY AV MW	18836.	18205.	17264.	15790.	14684.	14816.	14673.	15221.	15012.	15343.	17013.	18254.	16249.8
*L.F. %	79.3	80.4	79.7	79.1	79.2	77.5	76.3	78.4	78.6	80.5	77.9	76.4	78.5

*LOAD FACTOR BASED ON 1 HOUR PEAK

TOTAL SYSTEM ONTARIO PRIMARY DEMANDS
BASED ON LOAD FORECAST REPORT NO. 861208

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGE OR TOTAL
1993													
20 MIN PEAK MW	24364.	23160.	22153.	20412.	18953.	19538.	19627.	19846.	19545.	19518.	22386.	24485.	21166.1
1 HOUR PEAK MW	24113.	22971.	21987.	20244.	18786.	19380.	19490.	19704.	19380.	19318.	22172.	24274.	20985.6
ENERGY GWH	14330.	12508.	13131.	11619.	11171.	10907.	11161.	11577.	11049.	11662.	12516.	13877.	145510.2
ENERGY AV MW	19261.	18614.	17649.	16137.	15015.	15149.	15002.	15560.	15346.	15674.	17383.	18652.	16610.8
*L.F. %	79.9	81.0	80.3	79.7	79.9	78.2	77.0	79.0	79.2	81.1	78.4	76.8	79.2
1994													
20 MIN PEAK MW	24788.	23555.	22523.	20738.	19264.	19866.	19960.	20186.	19879.	19830.	22774.	24927.	21524.2
1 HOUR PEAK MW	24531.	23360.	22351.	20564.	19093.	19703.	19820.	20040.	19712.	19626.	22555.	24711.	21338.9
ENERGY GWH	14666.	12800.	13433.	11881.	11432.	11160.	11419.	11845.	11303.	11917.	12792.	14185.	148832.1
ENERGY AV MW	19713.	19048.	18055.	16502.	15366.	15500.	15348.	15920.	15699.	16018.	17767.	19066.	16990.0
*L.F. %	80.4	81.5	80.8	80.2	80.5	78.7	77.4	79.4	79.6	81.6	78.8	77.2	79.6
1995													
20 MIN PEAK MW	25279.	24013.	22953.	21118.	19636.	20255.	20352.	20585.	20270.	20189.	23213.	25425.	21940.1
1 HOUR PEAK MW	25017.	23813.	22777.	20939.	19460.	20089.	20208.	20435.	20098.	19979.	22989.	25203.	21750.2
ENERGY GWH	15021.	13107.	13750.	12157.	11706.	11427.	11691.	12128.	11572.	12186.	13084.	14513.	152343.4
ENERGY AV MW	20190.	19504.	18481.	16885.	15734.	15871.	15714.	16301.	16072.	16379.	18173.	19507.	17390.8
*L.F. %	80.7	81.9	81.1	80.6	80.9	79.0	77.8	79.8	80.0	82.0	79.1	77.4	80.0
1996													
20 MIN PEAK MW	25766.	24467.	23379.	21498.	20019.	20657.	20759.	20999.	20680.	20562.	23664.	25938.	22365.8
1 HOUR PEAK MW	25496.	24261.	23201.	21316.	19838.	20485.	20611.	20846.	20504.	20345.	23435.	25710.	22170.6
ENERGY GWH	15359.	13399.	14054.	12419.	11972.	11687.	11956.	12403.	11833.	12442.	13367.	14830.	155724.1
ENERGY AV MW	20644.	19939.	18890.	17249.	16092.	16233.	16070.	16671.	16435.	16724.	18565.	19933.	17776.7
*L.F. %	81.0	82.2	81.4	80.9	81.1	79.2	78.0	80.0	80.2	82.2	79.2	77.5	80.2
1997													
20 MIN PEAK MW	26264.	24933.	23820.	21893.	20420.	21077.	21184.	21433.	21107.	20943.	24129.	26460.	22805.8
1 HOUR PEAK MW	25987.	24724.	23636.	21706.	20235.	20902.	21032.	21276.	20928.	20722.	23892.	26226.	22605.9
ENERGY GWH	15684.	13680.	14344.	12669.	12227.	11936.	12210.	12667.	12085.	12687.	13637.	15135.	158958.2
ENERGY AV MW	21080.	20357.	19279.	17595.	16434.	16578.	16411.	17025.	16785.	17052.	18940.	20342.	18145.9
*L.F. %	81.1	82.3	81.6	81.1	81.2	79.3	78.0	80.0	80.2	82.3	79.3	77.6	80.3
1998													
20 MIN PEAK MW	26734.	25374.	24237.	22266.	20803.	21476.	21586.	21842.	21510.	21299.	24560.	26947.	23219.5
1 HOUR PEAK MW	26450.	25159.	24047.	22074.	20613.	21296.	21431.	21681.	21325.	21072.	24317.	26708.	23014.5
ENERGY GWH	15980.	13936.	14610.	12899.	12465.	12168.	12448.	12917.	12323.	12921.	13895.	15426.	161987.8
ENERGY AV MW	21478.	20738.	19637.	17915.	16753.	16900.	16731.	17362.	17116.	17367.	19299.	20734.	18491.8
*L.F. %	81.2	82.4	81.7	81.2	81.3	79.4	78.1	80.1	80.3	82.4	79.4	77.6	80.3
1999													
20 MIN PEAK MW	27135.	25749.	24590.	22579.	21128.	21815.	21928.	22189.	21849.	21596.	24923.	27359.	23570.4
1 HOUR PEAK MW	26846.	25528.	24396.	22384.	20935.	21632.	21770.	22024.	21660.	21366.	24676.	27115.	23361.7
ENERGY GWH	16235.	14159.	14840.	13097.	12670.	12370.	12655.	13132.	12529.	13121.	14118.	15679.	164607.2
ENERGY AV MW	21821.	21070.	19947.	18191.	17030.	17180.	17009.	17651.	17402.	17636.	19608.	21074.	18790.8
*L.F. %	81.3	82.5	81.8	81.3	81.3	79.4	78.1	80.1	80.3	82.5	79.5	77.7	80.4

*LOAD FACTOR BASED ON 1 HOUR PEAK

TOTAL SYSTEM ONTARIO PRIMARY DEMANDS
BASED ON LOAD FORECAST REPORT NO. 861208

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGE OR TOTAL
2000													
20 MIN PEAK MW	27522.	26109.	24929.	22883.	21440.	22141.	22255.	22523.	22176.	21883.	25273.	27757.	23908.0
1 HOUR PEAK MW	27226.	25886.	24733.	22684.	21244.	21954.	22094.	22356.	21984.	21647.	25022.	27508.	23695.2
ENERGY GWH	16486.	14376.	15066.	13293.	12871.	12567.	12855.	13344.	12730.	13319.	14336.	15926.	167166.6
ENERGY AV MW	22159.	21393.	20250.	18462.	17299.	17454.	17278.	17935.	17680.	17902.	19912.	21406.	19082.9
#L.F. %	81.4	82.6	81.9	81.4	81.4	79.5	78.2	80.2	80.4	82.7	79.6	77.8	80.5
2001													
20 MIN PEAK MW	28025.	26589.	25390.	23305.	21856.	22574.	22695.	22973.	22624.	22311.	25785.	28331.	24371.1
1 HOUR PEAK MW	27722.	26360.	25190.	23103.	21654.	22383.	22531.	22803.	22427.	22071.	25528.	28077.	24153.9
ENERGY GWH	16818.	14668.	15375.	13567.	13142.	12834.	13130.	13633.	13007.	13608.	14654.	16282.	170718.8
ENERGY AV MW	22605.	21828.	20666.	18843.	17663.	17825.	17648.	18324.	18065.	18290.	20352.	21885.	19488.4
#L.F. %	81.5	82.8	82.0	81.6	81.6	79.6	78.3	80.4	80.6	82.9	79.7	77.9	80.7
2002													
20 MIN PEAK MW	28525.	27063.	25840.	23716.	22249.	22981.	23106.	23390.	23033.	22705.	26248.	28844.	24808.4
1 HOUR PEAK MW	28217.	26829.	25636.	23508.	22043.	22786.	22939.	23216.	22833.	22461.	25985.	28585.	24586.5
ENERGY GWH	17131.	14940.	15659.	13816.	13387.	13073.	13376.	13887.	13250.	13859.	14925.	16584.	173887.2
ENERGY AV MW	23025.	22233.	21048.	19189.	17993.	18157.	17978.	18665.	18403.	18628.	20729.	22290.	19850.1
#L.F. %	81.6	82.9	82.1	81.6	81.6	79.7	78.4	80.4	80.6	82.9	79.8	78.0	80.7
2003													
20 MIN PEAK MW	29038.	27548.	26302.	24137.	22651.	23399.	23528.	23816.	23454.	23111.	26722.	29369.	25256.6
1 HOUR PEAK MW	28725.	27310.	26094.	23926.	22442.	23201.	23357.	23639.	23250.	22861.	26454.	29105.	25030.7
ENERGY GWH	17447.	15215.	15947.	14070.	13635.	13317.	13623.	14146.	13496.	14112.	15200.	16890.	177097.7
ENERGY AV MW	23450.	22642.	21434.	19542.	18327.	18495.	18310.	19013.	18744.	18968.	21111.	22701.	20216.6
#L.F. %	81.6	82.9	82.1	81.7	81.7	79.7	78.4	80.4	80.6	83.0	79.8	78.0	80.8
2004													
20 MIN PEAK MW	29501.	27985.	26718.	24516.	23015.	23776.	23906.	24200.	23832.	23472.	27147.	29839.	25659.6
1 HOUR PEAK MW	29183.	27743.	26507.	24301.	22803.	23575.	23732.	24019.	23625.	23218.	26875.	29571.	25429.8
ENERGY GWH	17732.	15464.	16207.	14298.	13859.	13535.	13847.	14378.	13718.	14340.	15447.	17167.	179992.1
ENERGY AV MW	23833.	23012.	21784.	19858.	18627.	18798.	18612.	19326.	19053.	19274.	21454.	23075.	20547.0
#L.F. %	81.7	82.9	82.2	81.7	81.7	79.7	78.4	80.5	80.7	83.0	79.8	78.0	80.8
2005													
20 MIN PEAK MW	29944.	28403.	27116.	24879.	23363.	24137.	24270.	24568.	24193.	23818.	27551.	30289.	26044.8
1 HOUR PEAK MW	29621.	28158.	26901.	24660.	23147.	23933.	24092.	24384.	23983.	23559.	27275.	30015.	25811.0
ENERGY GWH	18005.	15701.	16455.	14515.	14073.	13745.	14062.	14602.	13932.	14558.	15683.	17431.	182762.8
ENERGY AV MW	24201.	23365.	22117.	20160.	18916.	19090.	18901.	19626.	19349.	19567.	21782.	23429.	20863.3
#L.F. %	81.7	83.0	82.2	81.8	81.7	79.8	78.5	80.5	80.7	83.1	79.9	78.1	80.8

#LOAD FACTOR BASED ON 1 HOUR PEAK

EAST SYSTEM ONTARIO PRIMARY DEMANDS
BASED ON THE LOAD FORECAST REPORT NO. 861208

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGE OR TOTAL
1986													
20 MIN PEAK MW	19574.	18644.	17860.	16503.	15299.	15787.	15910.	16083.	15900.	15885.	18224.	19828.	17124.8
1 HOUR PEAK MW	19375.	18489.	17726.	16368.	15166.	15658.	15800.	15967.	15770.	15725.	18052.	19660.	16979.8
ENERGY GWH	11252.	9850.	10353.	9119.	8742.	8534.	8769.	9078.	8695.	9169.	9895.	10929.	114384.6
ENERGY AV MW	15124.	14658.	13915.	12665.	11750.	11853.	11786.	12201.	12076.	12324.	13743.	14689.	13057.6
*L.F. %	78.1	79.3	78.5	77.4	77.5	75.7	74.6	76.4	76.6	78.4	76.1	74.7	76.9
1987													
20 MIN PEAK MW	20261.	19325.	18501.	17077.	15800.	16412.	16502.	16690.	16441.	16411.	18821.	20457.	17724.8
1 HOUR PEAK MW	20055.	19166.	18363.	16938.	15664.	16280.	16388.	16570.	16306.	16247.	18643.	20284.	17575.3
ENERGY GWH	11642.	10204.	10718.	9434.	9020.	8867.	9091.	9409.	8986.	9464.	10208.	11268.	118311.7
ENERGY AV MW	15648.	15184.	14406.	13103.	12124.	12315.	12219.	12647.	12481.	12721.	14178.	15145.	13505.9
*L.F. %	78.0	79.2	78.5	77.4	77.4	75.6	74.6	76.3	76.5	78.3	76.0	74.7	76.8
1988													
20 MIN PEAK MW	20834.	19870.	19024.	17601.	16364.	16895.	16986.	17203.	16924.	16898.	19370.	21142.	18259.3
1 HOUR PEAK MW	20621.	19706.	18882.	17458.	16223.	16759.	16870.	17079.	16785.	16728.	19188.	20964.	18105.1
ENERGY GWH	11962.	10857.	11010.	9714.	9339.	9115.	9342.	9685.	9240.	9732.	10494.	11639.	122131.0
ENERGY AV MW	16078.	15599.	14799.	13491.	12553.	12660.	12557.	13018.	12833.	13081.	14575.	15644.	13903.8
*L.F. %	78.0	79.2	78.4	77.3	77.4	75.5	74.4	76.2	76.5	78.2	76.0	74.6	76.8
1989													
20 MIN PEAK MW	21518.	20512.	19631.	18150.	16862.	17399.	17424.	17636.	17347.	17304.	19840.	21619.	18770.2
1 HOUR PEAK MW	21298.	20343.	19484.	18002.	16716.	17259.	17305.	17510.	17205.	17131.	19653.	21435.	18611.8
ENERGY GWH	12353.	10820.	11360.	10017.	9624.	9387.	9557.	9916.	9469.	9974.	10730.	11885.	125092.8
ENERGY AV MW	16604.	16101.	15269.	13912.	12936.	13037.	12845.	13328.	13151.	13406.	14903.	15975.	14280.0
*L.F. %	78.0	79.1	78.4	77.3	77.4	75.5	74.2	76.1	76.4	78.3	75.8	74.5	76.7
1990													
20 MIN PEAK MW	22027.	20986.	20072.	18543.	17198.	17748.	17836.	18048.	17748.	17701.	20314.	22149.	19197.5
1 HOUR PEAK MW	21802.	20813.	19920.	18391.	17050.	17606.	17715.	17919.	17602.	17523.	20123.	21961.	19035.4
ENERGY GWH	12638.	11032.	11586.	10209.	9799.	9561.	9778.	10142.	9680.	10197.	10979.	12170.	127770.7
ENERGY AV MW	16986.	16417.	15573.	14179.	13171.	13279.	13142.	13632.	13445.	13705.	15249.	16357.	14585.7
*L.F. %	77.9	78.9	78.2	77.1	77.2	75.4	74.2	76.1	76.4	78.2	75.8	74.5	76.6
1991													
20 MIN PEAK MW	22488.	21417.	20478.	18921.	17538.	18105.	18197.	18414.	18118.	18070.	20746.	22659.	19595.9
1 HOUR PEAK MW	22256.	21239.	20325.	18767.	17387.	17959.	18073.	18284.	17969.	17889.	20550.	22466.	19430.4
ENERGY GWH	12899.	11256.	11818.	10415.	9989.	9739.	9968.	10347.	9873.	10403.	11208.	12437.	130349.7
ENERGY AV MW	17337.	16750.	15884.	14465.	13426.	13526.	13398.	13907.	13713.	13983.	15566.	16717.	14880.1
*L.F. %	77.9	78.9	78.2	77.1	77.2	75.3	74.1	76.1	76.3	78.2	75.7	74.4	76.6
1992													
20 MIN PEAK MW	22930.	21823.	20854.	19246.	17846.	18417.	18503.	18717.	18404.	18322.	21053.	23007.	19926.7
1 HOUR PEAK MW	22692.	21641.	20694.	19086.	17689.	18266.	18372.	18582.	18249.	18134.	20849.	22807.	19755.0
ENERGY GWH	13278.	11583.	12168.	10741.	10317.	10059.	10309.	10700.	10208.	10754.	11561.	12833.	134509.7
ENERGY AV MW	17847.	17236.	16355.	14918.	13867.	13970.	13856.	14382.	14177.	14455.	16057.	17248.	15355.0
*L.F. %	78.6	79.6	79.0	78.2	78.4	76.5	75.4	77.4	77.7	79.7	77.0	75.6	77.7

* LOAD FACTOR BASED ON 1 HOUR PEAK

EAST SYSTEM ONTARIO PRIMARY DEMANDS
BASED ON THE LOAD FORECAST REPORT NO. 861208

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGE OR TOTAL
1993													
20 MIN PEAK MW	23279.	22146.	21154.	19507.	18087.	18672.	18762.	18981.	18663.	18567.	21363.	23363.	20211.8
1 HOUR PEAK MW	23036.	21960.	20990.	19344.	17926.	18518.	18628.	18843.	18503.	18374.	21153.	23159.	20036.0
ENERGY GWH	13578.	11843.	12439.	10978.	10548.	10284.	10539.	10939.	10434.	10987.	11812.	13112.	137494.0
ENERGY AV MW	18250.	17624.	16720.	15247.	14178.	14283.	14165.	14703.	14492.	14767.	16405.	17624.	15695.7
*L.F. %	79.2	80.3	79.7	78.8	79.1	77.1	76.0	78.0	78.3	80.4	77.6	76.1	78.3
1994													
20 MIN PEAK MW	23682.	22520.	21503.	19816.	18381.	18984.	19077.	19305.	18980.	18861.	21731.	23783.	20551.8
1 HOUR PEAK MW	23432.	22329.	21335.	19648.	18216.	18825.	18940.	19163.	18817.	18664.	21516.	23573.	20371.4
ENERGY GWH	13897.	12119.	12726.	11225.	10793.	10522.	10782.	11191.	10673.	11227.	12073.	13404.	140629.2
ENERGY AV MW	18678.	18034.	17105.	15590.	14507.	14614.	14491.	15042.	14824.	15089.	16768.	18015.	16053.6
*L.F. %	79.7	80.8	80.2	79.3	79.6	77.6	76.5	78.5	78.8	80.8	77.9	76.4	78.8
1995													
20 MIN PEAK MW	24150.	22956.	21911.	20177.	18733.	19353.	19450.	19684.	19351.	19199.	22146.	24254.	20946.6
1 HOUR PEAK MW	23894.	22760.	21739.	20004.	18563.	19190.	19309.	19538.	19183.	18996.	21926.	24039.	20761.2
ENERGY GWH	14232.	12408.	13027.	11484.	11053.	10775.	11039.	11458.	10927.	11479.	12348.	13712.	143943.5
ENERGY AV MW	19129.	18465.	17509.	15950.	14857.	14965.	14837.	15401.	15177.	15428.	17150.	18430.	16431.9
*L.F. %	80.1	81.1	80.5	79.7	80.0	78.0	76.8	78.8	79.1	81.2	78.2	76.7	79.1
1996													
20 MIN PEAK MW	24610.	23385.	22312.	20534.	19089.	19726.	19828.	20069.	19729.	19538.	22563.	24729.	21343.0
1 HOUR PEAK MW	24347.	23183.	22136.	20357.	18915.	19559.	19683.	19920.	19556.	19329.	22337.	24507.	21152.8
ENERGY GWH	14553.	12686.	13313.	11732.	11304.	11019.	11288.	11719.	11174.	11720.	12615.	14011.	147132.9
ENERGY AV MW	19561.	18878.	17894.	16295.	15193.	15304.	15172.	15751.	15519.	15753.	17520.	18833.	16796.0
*L.F. %	80.3	81.4	80.8	80.0	80.3	78.2	77.1	79.1	79.4	81.5	78.4	76.8	79.4
1997													
20 MIN PEAK MW	25072.	23818.	22721.	20899.	19463.	20120.	20227.	20478.	20132.	19897.	23003.	25225.	21754.9
1 HOUR PEAK MW	24803.	23612.	22540.	20717.	19284.	19949.	20079.	20325.	19956.	19684.	22770.	24998.	21559.9
ENERGY GWH	14860.	12951.	13588.	11967.	11545.	11252.	11527.	11968.	11411.	11950.	12868.	14297.	150182.5
ENERGY AV MW	19973.	19272.	18263.	16621.	15517.	15628.	15494.	16086.	15848.	16062.	17872.	19217.	17144.1
*L.F. %	80.5	81.6	81.0	80.2	80.5	78.3	77.2	79.1	79.4	81.6	78.5	76.9	79.5
1998													
20 MIN PEAK MW	25520.	24239.	23118.	21255.	19827.	20500.	20611.	20868.	20515.	20234.	23413.	25689.	22149.2
1 HOUR PEAK MW	25244.	24028.	22932.	21068.	19644.	20324.	20459.	20711.	20334.	20015.	23175.	25457.	21949.6
ENERGY GWH	15140.	13193.	13840.	12185.	11768.	11471.	11751.	12204.	11635.	12169.	13112.	14573.	153040.6
ENERGY AV MW	20350.	19633.	18602.	16923.	15817.	15932.	15795.	16403.	16159.	16356.	18211.	19588.	17470.4
*L.F. %	80.6	81.7	81.1	80.3	80.5	78.4	77.2	79.2	79.5	81.7	78.6	76.9	79.6
1999													
20 MIN PEAK MW	25903.	24597.	23456.	21556.	20139.	20826.	20940.	21203.	20845.	20520.	23766.	26088.	22486.6
1 HOUR PEAK MW	25622.	24381.	23266.	21367.	19953.	20647.	20785.	21043.	20660.	20298.	23523.	25851.	22283.0
ENERGY GWH	15383.	13403.	14058.	12372.	11962.	11661.	11945.	12407.	11829.	12358.	13322.	14812.	155510.8
ENERGY AV MW	20676.	19945.	18895.	17183.	16078.	16195.	16056.	16676.	16429.	16610.	18503.	19908.	17752.4
*L.F. %	80.7	81.8	81.2	80.4	80.6	78.4	77.2	79.2	79.5	81.8	78.7	77.0	79.7

* LOAD FACTOR BASED ON 1 HOUR PEAK

EAST SYSTEM ONTARIO PRIMARY DEMANDS
BASED ON THE LOAD FORECAST REPORT NO. 861208

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGE OR TOTAL
2000													
20 MIN PEAK MW	26278.	24948.	23786.	21853.	20444.	21144.	21261.	21531.	21164.	20802.	24109.	26476.	22816.8
1 HOUR PEAK MW	25991.	24729.	23594.	21659.	20254.	20962.	21103.	21368.	20976.	20575.	23862.	26235.	22609.4
ENERGY GWH	15619.	13609.	14270.	12556.	12150.	11846.	12135.	12606.	12018.	12542.	13527.	15045.	157925.1
ENERGY AV MW	20994.	20251.	19181.	17439.	16331.	16453.	16311.	16943.	16692.	16858.	18787.	20221.	18028.0
*L.F. %	80.8	81.9	81.3	80.5	80.6	78.5	77.3	79.3	79.6	81.9	78.7	77.1	79.7
2001													
20 MIN PEAK MW	26767.	25415.	24233.	22262.	20845.	21564.	21686.	21965.	21594.	21211.	24597.	27024.	23263.5
1 HOUR PEAK MW	26473.	25190.	24036.	22065.	20651.	21378.	21525.	21799.	21402.	20979.	24345.	26778.	23051.5
ENERGY GWH	15934.	13885.	14563.	12814.	12406.	12098.	12395.	12879.	12280.	12816.	13826.	15382.	161279.1
ENERGY AV MW	21416.	20663.	19574.	17798.	16674.	16802.	16660.	17310.	17056.	17226.	19203.	20674.	18410.9
*L.F. %	80.9	82.0	81.4	80.7	80.7	78.6	77.4	79.4	79.7	82.1	78.9	77.2	79.9
2002													
20 MIN PEAK MW	27246.	25867.	24663.	22656.	21220.	21953.	22078.	22363.	21986.	21585.	25039.	27513.	23680.9
1 HOUR PEAK MW	26947.	25638.	24462.	22454.	21021.	21763.	21914.	22193.	21789.	21349.	24781.	27262.	23464.7
ENERGY GWH	16230.	14143.	14833.	13050.	12638.	12324.	12627.	13119.	12510.	13051.	14082.	15666.	164271.3
ENERGY AV MW	21815.	21046.	19937.	18125.	16986.	17116.	16972.	17633.	17375.	17542.	19558.	21057.	18752.4
*L.F. %	81.0	82.1	81.5	80.7	80.8	78.6	77.4	79.5	79.7	82.2	78.9	77.2	79.9
2003													
20 MIN PEAK MW	27735.	26331.	25104.	23057.	21604.	22352.	22481.	22771.	22386.	21970.	25491.	28013.	24108.1
1 HOUR PEAK MW	27431.	26098.	24899.	22852.	21402.	22159.	22313.	22598.	22186.	21729.	25228.	27757.	23887.7
ENERGY GWH	16529.	14403.	15105.	13289.	12872.	12552.	12861.	13363.	12742.	13289.	14341.	15955.	167304.0
ENERGY AV MW	22217.	21433.	20303.	18457.	17301.	17434.	17286.	17960.	17697.	17862.	19917.	21445.	19098.6
*L.F. %	81.0	82.1	81.5	80.8	80.8	78.7	77.5	79.5	79.8	82.2	78.9	77.3	80.0
2004													
20 MIN PEAK MW	28178.	26749.	25501.	23420.	21950.	22712.	22842.	23138.	22747.	22314.	25896.	28462.	24492.3
1 HOUR PEAK MW	27868.	26512.	25293.	23211.	21745.	22516.	22672.	22962.	22544.	22069.	25629.	28201.	24268.1
ENERGY GWH	16799.	14638.	15350.	13504.	13083.	12758.	13072.	13583.	12952.	13505.	14575.	16216.	170036.0
ENERGY AV MW	22579.	21783.	20632.	18756.	17585.	17719.	17570.	18257.	17989.	18151.	20242.	21796.	19410.5
*L.F. %	81.0	82.2	81.6	80.8	80.9	78.7	77.5	79.5	79.8	82.2	79.0	77.3	80.0
2005													
20 MIN PEAK MW	28600.	27148.	25881.	23766.	22282.	23056.	23189.	23489.	23092.	22643.	26282.	28890.	24860.1
1 HOUR PEAK MW	28285.	26907.	25669.	23553.	22073.	22856.	23015.	23310.	22886.	22393.	26011.	28625.	24632.3
ENERGY GWH	17058.	14863.	15586.	13710.	13286.	12955.	13275.	13794.	13153.	13710.	14798.	16465.	172652.4
ENERGY AV MW	22928.	22118.	20949.	19041.	17858.	17994.	17843.	18540.	18268.	18427.	20552.	22131.	19709.2
*L.F. %	81.1	82.2	81.6	80.8	80.9	78.7	77.5	79.5	79.8	82.3	79.0	77.3	80.0

* LOAD FACTOR BASED ON 1 HOUR PEAK

WEST SYSTEM ONTARIO PRIMARY DEMANDS
BASED ON THE LOAD FORECAST REPORT NO. 861208

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGE OR TOTAL
1986													
20 MIN PEAK MW	985.	970.	916.	851.	818.	794.	798.	804.	874.	866.	922.	997.	882.9
1 HOUR PEAK MW	979.	965.	912.	846.	813.	791.	794.	800.	869.	861.	917.	991.	878.3
ENERGY GWH	627.	553.	565.	526.	518.	508.	507.	521.	516.	553.	576.	621.	6589.3
ENERGY AV MW	843.	823.	759.	730.	696.	705.	682.	700.	716.	743.	800.	835.	752.2
#L.F. %	86.1	85.3	83.2	86.3	85.6	89.1	85.9	87.5	82.4	86.3	87.2	84.3	85.6
1987													
20 MIN PEAK MW	995.	968.	927.	869.	832.	814.	818.	823.	885.	886.	940.	1020.	898.0
1 HOUR PEAK MW	989.	963.	923.	864.	827.	811.	815.	818.	879.	882.	936.	1015.	893.5
ENERGY GWH	636.	559.	582.	539.	529.	522.	520.	533.	520.	565.	585.	635.	6727.7
ENERGY AV MW	855.	832.	782.	748.	711.	725.	699.	716.	722.	759.	817.	854.	768.0
#L.F. %	86.5	86.4	84.7	86.6	86.0	89.4	85.8	87.5	82.1	86.1	87.3	84.1	86.0
1988													
20 MIN PEAK MW	1018.	991.	949.	890.	852.	833.	836.	843.	906.	905.	962.	1049.	919.5
1 HOUR PEAK MW	1011.	986.	945.	886.	847.	829.	833.	838.	901.	901.	957.	1043.	914.7
ENERGY GWH	650.	593.	596.	552.	542.	534.	532.	545.	533.	577.	602.	653.	6908.6
ENERGY AV MW	874.	852.	801.	766.	728.	741.	715.	733.	740.	776.	836.	878.	786.5
#L.F. %	86.4	86.4	84.8	86.5	86.0	89.4	85.8	87.5	82.1	86.1	87.4	84.2	86.0
1989													
20 MIN PEAK MW	1038.	1010.	966.	905.	865.	845.	848.	855.	918.	917.	975.	1066.	933.9
1 HOUR PEAK MW	1031.	1005.	962.	900.	860.	841.	844.	850.	913.	912.	970.	1060.	929.0
ENERGY GWH	664.	583.	607.	561.	550.	541.	540.	553.	540.	586.	611.	664.	7000.1
ENERGY AV MW	892.	868.	816.	779.	739.	752.	726.	743.	750.	787.	848.	892.	799.1
#L.F. %	86.5	86.4	84.8	86.6	85.9	89.4	86.0	87.4	82.1	86.3	87.4	84.2	86.0
1990													
20 MIN PEAK MW	1075.	1045.	1000.	938.	889.	875.	877.	884.	943.	949.	1007.	1125.	967.1
1 HOUR PEAK MW	1067.	1040.	995.	933.	884.	871.	874.	879.	937.	944.	1002.	1118.	962.0
ENERGY GWH	687.	605.	628.	582.	565.	561.	559.	572.	554.	606.	631.	700.	7248.9
ENERGY AV MW	923.	901.	844.	808.	760.	779.	751.	769.	770.	814.	876.	941.	827.5
#L.F. %	86.5	86.6	84.8	86.6	86.0	89.4	85.9	87.5	82.2	86.2	87.4	84.2	86.0
1991													
20 MIN PEAK MW	1109.	1080.	1035.	972.	917.	909.	913.	921.	976.	990.	1052.	1152.	1002.1
1 HOUR PEAK MW	1101.	1075.	1030.	967.	911.	905.	910.	916.	971.	985.	1047.	1146.	997.0
ENERGY GWH	709.	626.	650.	603.	583.	583.	582.	597.	575.	632.	660.	718.	7517.8
ENERGY AV MW	953.	932.	874.	837.	783.	810.	782.	802.	799.	850.	916.	965.	858.2
#L.F. %	86.6	86.7	84.9	86.6	85.9	89.5	85.9	87.6	82.3	86.3	87.5	84.2	86.1
1992													
20 MIN PEAK MW	1106.	1076.	1030.	967.	910.	904.	908.	916.	974.	986.	1048.	1153.	998.4
1 HOUR PEAK MW	1099.	1072.	1026.	960.	904.	900.	904.	911.	968.	980.	1043.	1146.	993.0
ENERGY GWH	735.	650.	676.	628.	608.	609.	608.	624.	601.	661.	689.	748.	7840.0
ENERGY AV MW	988.	968.	909.	872.	818.	846.	818.	838.	835.	889.	956.	1006.	895.0
#L.F. %	89.9	90.3	88.6	90.8	90.5	94.0	90.4	92.0	86.3	90.7	91.7	87.8	90.1

LOAD FACTOR BASED ON 1 HOUR PEAK

WEST SYSTEM ONTARIO PRIMARY DEMANDS
BASED ON THE LOAD FORECAST REPORT NO. 861208

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGE OR TOTAL
1993													
20 MIN PEAK MW	1126.	1095.	1049.	983.	926.	920.	924.	932.	992.	1003.	1066.	1174.	1015.7
1 HOUR PEAK MW	1118.	1091.	1045.	977.	920.	916.	920.	927.	985.	997.	1061.	1167.	1010.2
ENERGY GWH	752.	665.	691.	642.	623.	624.	622.	638.	615.	675.	703.	765.	8016.2
ENERGY AV MW	1010.	990.	929.	892.	838.	866.	836.	857.	854.	907.	977.	1029.	915.1
#L.F. %	90.3	90.7	88.9	91.3	91.0	94.6	90.9	92.5	86.7	91.0	92.0	88.1	90.6
1994													
20 MIN PEAK MW	1148.	1117.	1070.	1002.	945.	938.	943.	951.	1012.	1024.	1088.	1198.	1036.3
1 HOUR PEAK MW	1141.	1113.	1065.	995.	938.	934.	938.	946.	1005.	1017.	1083.	1190.	1030.7
ENERGY GWH	770.	681.	707.	657.	637.	638.	637.	653.	630.	690.	719.	783.	8202.9
ENERGY AV MW	1035.	1014.	950.	912.	856.	886.	856.	878.	875.	928.	999.	1052.	936.4
#L.F. %	90.7	91.1	89.2	91.6	91.3	94.8	91.3	92.8	87.0	91.2	92.3	88.4	90.9
1995													
20 MIN PEAK MW	1173.	1142.	1093.	1023.	966.	959.	965.	973.	1036.	1046.	1113.	1226.	1059.5
1 HOUR PEAK MW	1166.	1138.	1088.	1016.	960.	955.	961.	968.	1029.	1040.	1108.	1218.	1053.7
ENERGY GWH	788.	698.	725.	673.	653.	653.	653.	669.	645.	707.	736.	801.	8399.9
ENERGY AV MW	1060.	1039.	974.	934.	877.	907.	877.	900.	896.	950.	1023.	1076.	958.9
#L.F. %	90.9	91.3	89.5	91.9	91.4	95.0	91.3	93.0	87.0	91.3	92.3	88.3	91.0
1996													
20 MIN PEAK MW	1199.	1167.	1116.	1045.	989.	981.	987.	994.	1058.	1067.	1135.	1251.	1082.4
1 HOUR PEAK MW	1191.	1163.	1112.	1038.	982.	976.	982.	989.	1052.	1060.	1130.	1243.	1076.5
ENERGY GWH	806.	714.	741.	688.	668.	669.	668.	684.	660.	722.	753.	819.	8591.2
ENERGY AV MW	1084.	1062.	996.	955.	898.	929.	898.	920.	917.	971.	1046.	1101.	980.7
#L.F. %	91.0	91.3	89.6	92.0	91.5	95.1	91.4	93.0	87.2	91.6	92.6	88.5	91.1
1997													
20 MIN PEAK MW	1224.	1190.	1138.	1065.	1010.	1002.	1008.	1016.	1082.	1089.	1160.	1278.	1105.1
1 HOUR PEAK MW	1216.	1186.	1134.	1058.	1003.	997.	1003.	1010.	1076.	1082.	1154.	1270.	1099.1
ENERGY GWH	824.	729.	756.	702.	683.	684.	682.	700.	674.	737.	768.	836.	8774.7
ENERGY AV MW	1108.	1085.	1016.	974.	919.	950.	917.	941.	937.	991.	1067.	1124.	1001.7
#L.F. %	91.1	91.5	89.7	92.1	91.6	95.2	91.4	93.1	87.1	91.6	92.5	88.5	91.1
1998													
20 MIN PEAK MW	1246.	1212.	1160.	1085.	1029.	1022.	1028.	1037.	1105.	1109.	1181.	1302.	1126.0
1 HOUR PEAK MW	1238.	1207.	1155.	1078.	1022.	1018.	1024.	1031.	1098.	1102.	1175.	1294.	1119.8
ENERGY GWH	840.	742.	770.	715.	697.	697.	697.	713.	688.	752.	784.	853.	8947.2
ENERGY AV MW	1129.	1105.	1035.	994.	936.	968.	936.	959.	956.	1010.	1089.	1147.	1021.4
#L.F. %	91.1	91.5	89.6	92.2	91.6	95.1	91.5	93.0	87.1	91.7	92.6	88.6	91.2
1999													
20 MIN PEAK MW	1266.	1231.	1177.	1100.	1046.	1038.	1044.	1053.	1122.	1125.	1198.	1323.	1143.3
1 HOUR PEAK MW	1258.	1226.	1172.	1093.	1039.	1034.	1040.	1047.	1115.	1118.	1193.	1314.	1137.0
ENERGY GWH	854.	754.	783.	726.	709.	709.	708.	726.	699.	763.	797.	868.	9096.4
ENERGY AV MW	1148.	1123.	1052.	1008.	953.	985.	951.	976.	971.	1026.	1107.	1166.	1038.4
#L.F. %	91.2	91.5	89.8	92.2	91.7	95.3	91.5	93.2	87.1	91.7	92.8	88.7	91.3

LOAD FACTOR BASED ON 1 HOUR PEAK

WEST SYSTEM ONTARIO PRIMARY DEMANDS
BASED ON THE LOAD FORECAST REPORT NO. 861208

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGE OR TOTAL
2000													
20 MIN PEAK MW	1285.	1248.	1193.	1115.	1062.	1055.	1060.	1070.	1139.	1141.	1216.	1342.	1159.9
1 HOUR PEAK MW	1274.	1244.	1188.	1108.	1055.	1050.	1055.	1064.	1132.	1133.	1210.	1334.	1153.4
ENERGY GWH	867.	767.	795.	738.	720.	721.	719.	738.	711.	776.	809.	881.	9241.5
ENERGY AV MW	1166.	1141.	1069.	1025.	968.	1001.	967.	992.	987.	1043.	1124.	1185.	1055.0
#L.F. %	91.5	91.8	89.9	92.5	91.8	95.4	91.6	93.2	87.2	92.0	92.9	88.8	91.5
2001													
20 MIN PEAK MW	1308.	1271.	1216.	1136.	1083.	1075.	1081.	1090.	1163.	1163.	1241.	1370.	1182.9
1 HOUR PEAK MW	1299.	1267.	1211.	1129.	1075.	1070.	1077.	1085.	1155.	1156.	1235.	1361.	1176.4
ENERGY GWH	885.	782.	811.	753.	735.	736.	735.	754.	727.	793.	827.	900.	9438.7
ENERGY AV MW	1190.	1164.	1090.	1046.	988.	1023.	988.	1013.	1010.	1065.	1148.	1210.	1077.5
#L.F. %	91.6	91.9	90.0	92.6	91.8	95.5	91.7	93.4	87.4	92.2	93.0	88.9	91.6
2002													
20 MIN PEAK MW	1331.	1294.	1237.	1157.	1103.	1094.	1101.	1111.	1184.	1184.	1263.	1395.	1204.2
1 HOUR PEAK MW	1322.	1289.	1232.	1149.	1095.	1089.	1096.	1105.	1177.	1177.	1257.	1386.	1197.5
ENERGY GWH	901.	797.	826.	767.	749.	750.	748.	768.	741.	808.	842.	918.	9615.9
ENERGY AV MW	1211.	1186.	1111.	1065.	1007.	1042.	1006.	1032.	1029.	1086.	1170.	1233.	1097.7
#L.F. %	91.6	92.1	90.2	92.7	92.0	95.6	91.8	93.4	87.4	92.2	93.1	89.0	91.7
2003													
20 MIN PEAK MW	1355.	1318.	1259.	1178.	1123.	1114.	1121.	1131.	1206.	1206.	1286.	1422.	1226.8
1 HOUR PEAK MW	1346.	1313.	1254.	1170.	1116.	1109.	1116.	1125.	1199.	1198.	1280.	1412.	1220.0
ENERGY GWH	918.	812.	842.	781.	763.	764.	763.	782.	754.	822.	858.	935.	9794.8
ENERGY AV MW	1233.	1208.	1132.	1085.	1026.	1061.	1026.	1051.	1048.	1105.	1192.	1256.	1118.1
#L.F. %	91.7	92.0	90.2	92.8	92.0	95.6	91.9	93.4	87.4	92.2	93.1	89.0	91.6
2004													
20 MIN PEAK MW	1376.	1339.	1279.	1196.	1142.	1133.	1139.	1150.	1226.	1225.	1307.	1444.	1246.1
1 HOUR PEAK MW	1367.	1334.	1274.	1188.	1134.	1127.	1134.	1144.	1218.	1217.	1300.	1435.	1239.2
ENERGY GWH	933.	826.	856.	793.	776.	776.	776.	796.	767.	836.	872.	951.	9956.1
ENERGY AV MW	1254.	1228.	1151.	1102.	1043.	1078.	1043.	1070.	1065.	1123.	1212.	1278.	1136.5
#L.F. %	91.7	92.1	90.3	92.7	92.0	95.6	91.9	93.5	87.4	92.3	93.2	89.0	91.7
2005													
20 MIN PEAK MW	1397.	1359.	1299.	1214.	1159.	1150.	1157.	1168.	1245.	1244.	1326.	1466.	1265.5
1 HOUR PEAK MW	1388.	1354.	1294.	1206.	1151.	1145.	1152.	1161.	1237.	1236.	1319.	1456.	1258.4
ENERGY GWH	948.	837.	868.	806.	788.	789.	788.	808.	779.	849.	886.	965.	10110.4
ENERGY AV MW	1274.	1246.	1167.	1119.	1059.	1096.	1059.	1086.	1081.	1141.	1231.	1297.	1154.2
#L.F. %	91.8	92.1	90.2	92.8	92.0	95.8	92.0	93.6	87.4	92.3	93.3	89.1	91.7

LOAD FACTOR BASED ON 1 HOUR PEAK

3.0 FORECAST PERFORMANCE

3.0.1 Forecasts Reviewed

The current report analyzes the performance of Load Forecast #861208 until the end of 1986.

3.0.2 Introduction to Forecast Performance Review

The forecast quantities which have operational significance to Ontario Hydro are those which trigger costs, revenues and planning activities in the physical and financial domains. In broad terms, physical planning and operations activities require chronological detail at the system level; transmission planning requires more geographical disaggregation and coarser load profiles. Financial planning activities are mainly concerned with annual figures by types of activity, but with high interest rates and the study of time of use pricing, a requirement for greater chronological detail is developing.

From a forecasting point of view, the analysis of forecast error is an important diagnostic tool, because the nature of the error provides insights to its source. Diagnosis is primarily a matter of forming a judgment as to whether a given error is transient (and can be ignored) or permanent (and requires remedial action).

Relative error generally increases with:

(1) detail of the forecast quantity, whether the detail is chronological or geographical, and

(2) the length of the forecast period.

For example, the forecast error of a given monthly peak in Cobourg may be due to:

(1) weather
(2) a strike
(3) the wrong seasonal pattern
(4) performance of the local economy
(5) the wrong underlying growth
(6) known changes since the forecast was made
(7) change in area covered by Cobourg Hydro
(8) error in forecast methodology

Patterns of error may emerge as forecast errors are accumulated over time and over space. As these patterns are identified, they can be applied in revisions to the forecast. Certain kinds of error, such as those due to weather effects, can be explained but not predicted, because it is climate, as opposed to weather, that is predictable. Weather is only predictable within limits on a probability basis, by assuming constant climate and stable variability. Prediction of the economy presents all of the problems associated with weather aggravated by the longer duration of bursts of economic weather and the unpredictability of economic climate.

3.1 Tracking Load Forecast 861208 to 1986 Actuals

3.1.1 Primary Demands

The Short-Term Primary Load Forecast (861208) was completed in early summer of 1986 and is based on regional estimates commencing January of that year. Since it is produced on the basis of estimates rather than actuals, once approved it's tracking of the current year actuals is monitored. This section compares the forecast of system demand and customer loads with the actuals for 1986.

Total System Primary Demands

	1-Hour Peak - GW					Energy - TW.h				
						Actual				
	1985	1986	Yr/Yr Growth	1986 Forecast 861208	% Deviation*	1985	1986	Yr/Yr Growth	1986 Forecast 861208	% Deviation*
Jan	19.2	20.6	6.9	20.3	1.3	11.4	11.9	4.0	11.9	0.0
Feb	18.7	19.5	4.2	19.4	0.3	10.1	10.7	6.4	10.4	3.1
Mar	18.7	19.4	3.5	18.6	4.1	10.4	10.9	4.7	10.9	-0.5
Apr	16.7	16.9	1.3	17.2	-1.6	9.2	9.5	3.1	9.6	-1.8
May	14.8	15.9	7.5	15.9	0.0	8.8	9.2	4.9	9.3	-0.2
Jun	14.8	15.9	7.4	16.4	-3.3	8.4	8.8	4.5	9.0	-2.5
Jul	15.5	16.9	8.9	16.5	2.0	8.9	9.4	5.9	9.3	1.2
Aug	16.0	16.4	2.7	16.7	-1.7	9.0	9.2	2.3	9.6	-3.8
Sep	16.1	15.8	-2.3	16.5	-4.9	8.9	9.1	2.0	9.2	-0.9
Oct	16.1	16.7	3.9	16.5	1.0	9.3	9.8	5.4	9.7	1.0
Nov	18.6	19.0	2.4	18.9	0.4	10.2	10.6	4.2	10.5	1.3
Dec	20.4	20.5	0.7	20.6	5.9	11.4	11.4	-0.1	11.4	-1.4
Avg	17.1	17.8	3.8	17.8	1.0	Tot 116.0	120.6	3.9	121.0	-0.3

* Per cent deviation from forecast.

The strong economic growth in 1985 spilt over the first quarter of 1986 which resulted in a higher-than-forecast peak. Economic growth for the rest of 1986 was close to what was predicted, resulting in only slight deviations from Load Forecast 861209. The exception was September, when forecast air-conditioning load never materialized due to the unusually cold weather.

3.1.2 Diversity and Losses

System customers are billed on their maximum monthly peak load, whenever in the month it may occur (the non-coincident peak load). This quantity will be equal to or greater than that customer's load at the time of system peak (the coincident load). Diversity is defined as the coincident load minus the non-coincident peak load. It is therefore zero or negative, because diversity reduces system peak demand. It is possible to measure diversity for individual system customers.

System peak losses are the difference between system peak and the sum of customers coincident loads, and system energy losses are the difference between energy sent out by the system and that received by the customers. It is not possible to allocate losses to individual customers. Losses are positive because they increase system demand.

For peak demands, the term net diversity and loss refers to the sum of the two.

Relationship Between System Demands and Customer Loads - 1986

The performance of Forecast 861208 on an average monthly basis was as follows:

Average Peak MW*	Actual 1985	Actual 1986	Increase MW	Increase %	1986 Forecast #861208	Deviation from Forecast MW	Deviation from Forecast %
System Demand	17137	17789	652	3.8	17807	-18	1.0
Customer Loads	17562	18182	620	3.5	18207	-25	0.1
Net Diversity & Loss	-425	-393	32	-7.5	-400	7	1.8
% Customer Loads	-2.4	-2.2			-2.2		
Energy TW.h							
System Demand	116.0	120.6	4.6	4.0	121.0	-.4	0.3
Customer Loads	111.2	115.3	4.1	3.7	115.6	-.3	0.3
Loss	4.8	5.3	.3	10.4	5.4	-.4	4.9
% Customer Loads	4.3	4.6			4.7		

* 1 Hour

Line losses in percent of customers peak and energy were very close to forecast, 4.6 and -2.2 compared to 4.7 and -2.2, respectively.

3.1.3 Unallocated Load

Since the forecast is the sum of the Regional estimates and the unallocated load that is eventually decided upon, the "actual" unallocated load is that which would have reduced the forecast error to zero.

The average monthly results for 1986 are:

Unallocated Load	Peak MW	Energy Av.MW
Forecast	-86	-57
"Actual"	-111	-94
Error (Actual-Forecast)	-25	-37

3.1.4 Detail of Customer Loads

(1) By Class

The monthly average results in terms of growth from 1985 and deviation from forecast are shown below:

Sum of Customers' Loads - 1986
(By Class)

1986 Average		Increase Over 1985 MW	Increase Over 1985 %	Deviation From F/C No. 861208 MW	Deviation From F/C No. 861208 %	Unallocated Load Forecast MW
Total	- Peak	619	3.5	-26	-0.1	-76
	- Energy	466	3.7	-37	-0.3	-57
Municipal	- Peak	430	3.6	-26	-0.2	15
	- Energy	332	3.8	-20	-0.2	10
Retail	- Peak	124	4.6	0	-0.0	1
	- Energy	77	4.3	0	-0.0	-1
Direct	- Peak	66	2.4	1	0.0	-92

(2) By Region

Sum of Customers' Loads - 1986
(By Regions)

1986 Average		Increase Over 1985 MW	Increase Over 1985 %	Deviation From F/C No. 861208 MW	Deviation From F/C No. 861208 %	Unallocated Load Forecast MW
Total	- Peak	619	3.5	-26	-0.1	-76
	- Energy	466	3.7	-37	-0.3	-57
Central	- Peak	351	4.3	-2	-0.0	-21
	- Energy	221	4.0	17	-0.3	-9
Western	- Peak	128	3.6	18	0.5	-36
	- Energy	47	3.2	15	-0.9	-21
Eastern	- Peak	94	4.0	3	0.1	-5
	- Energy	41	4.2	8	0.8	-13
Geo Bay	- Peak	36	3.5	-10	-0.9	-2
	- Energy	14	4.6	6	1.8	0
N.Eastern	- Peak	0	0.0	-33	-2.1	-1
	- Energy	9	4.3	4	1.6	-4
N.Western	- Peak	9	1.0	2	-0.3	-10
	- Energy	-1	-0.1	-6	-3.3	-9

Reasons for varying growth rates over 1985 and deviation from forecast are diverse, but may generally be related to economic conditions in 1986.

Further chronological and regional class detail are available in the attached tables.

COMPARISON OF ACTUAL AND ESTIMATED ONTARIO PRIMARY 1-HOUR PEAK DEMANDS
BASED ON THE 1986 SHORT-TERM LOAD FORECAST
FOR THE PERIOD FROM JAN 1986 TO DEC 1986
% ERROR=(ACTUAL-FORECAST)/FORECAST*100.0

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TO DATE
NIAGARA 25 HZ													
1986 ACT.	78	80	97	92	86	81	87	85	82	82	84	84	
EST.	82	82	82	83	83	82	82	82	83	82	82	82	
	-4.88	-2.44	18.29	10.84	3.61	-1.22	6.10	3.66	-1.20	.00	2.44	2.44	3.14
NORTHEAST 25 HZ													
1986 ACT.	41	42	37	36	36	35	32	32	39	38	39	41	
EST.	39	38	38	38	38	38	38	37	38	38	38	38	
	5.13	10.53	-2.63	-5.26	-5.26	-7.89	-15.79	-13.51	2.63	.00	2.63	7.89	-1.75
EAST SYSTEM 60 HZ													
1986 ACT.	19533	18468	18378	16005	15056	14991	16025	15555	14932	15786	18012	19518	
EST.	19284	18399	17636	16277	15075	15568	15710	15878	15679	15635	17962	19570	
	1.29	.38	4.21	-1.67	-.13	-3.71	2.01	-2.03	-4.76	.97	.28	-.27	-.20
EAST SYSTEM TOTAL													
1986 ACT.	19616	18570	18466	16093	15149	15085	16123	15641	15024	15869	18089	19608	
EST.	19375	18489	17726	16368	15166	15658	15800	15967	15770	15725	18052	19660	
	1.24	.44	4.17	-1.68	-.11	-3.66	2.04	-2.04	-4.73	.92	.20	-.26	-.21
WEST SYSTEM													
1986 ACT.	984	943	935	824	814	802	825	809	779	859	950	956	
EST.	979	965	912	846	813	791	794	800	869	861	917	991	
	.51	-2.28	2.52	-2.60	.12	1.39	3.90	1.12	-10.36	-.23	3.60	-3.53	-.55
ALL SYSTEM													
1986 ACT.	20586	19450	19368	16852	15933	15887	16882	16432	15773	16712	19019	20536	
EST.	20320	19386	18598	17151	15930	16406	16547	16712	16547	16544	18934	20610	
	1.31	.33	4.14	-1.74	.02	-3.16	2.02	-1.68	-4.68	1.02	.45	-.36	-.12

COMPARISON OF ACTUAL AND ESTIMATED ONTARIO PRIMARY ENERGY DEMANDS
BASED ON THE 1986 SHORT-TERM LOAD FORECAST
FOR THE PERIOD FROM JAN 1986 TO DEC 1986
% ERROR=(ACTUAL-FORECAST)/FORECAST*100.0

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TO DATE
NIAGARA 25 HZ													
1986 ACT.	61	62	64	64	64	64	57	60	59	62	63	60	
EST.	57	57	57	57	57	57	56	57	55	57	57	56	
	7.02	8.77	12.28	12.28	12.28	12.28	1.79	5.26	7.27	8.77	10.53	7.14	8.80
NORTHEAST 25 HZ													
1986 ACT.	28	35	28	24	26	23	25	26	29	29	31	29	
EST.	27	27	27	27	27	26	26	25	26	26	27	26	
	3.70	29.63	3.70	-11.11	-3.70	-11.54	-3.85	4.00	11.54	11.54	14.81	11.54	4.89
EAST SYSTEM 60 HZ													
1986 ACT.	15033	15050	13765	12353	11629	11480	11856	11652	11893	12372	13851	14422	
EST.	15040	14574	13831	12581	11666	11770	11704	12119	11995	12241	13659	14607	
	-.05	3.27	-.48	-1.81	-.32	-2.46	1.30	-3.85	-.85	1.07	1.41	-1.27	-.30
EAST SYSTEM TOTAL													
1986 ACT.	15122	15147	13857	12441	11719	11566	11938	11738	11980	12463	13945	14512	
EST.	15124	14658	13915	12665	11750	11853	11786	12201	12076	12324	13743	14689	
	-.01	3.34	-.42	-1.77	-.26	-2.42	1.29	-3.79	-.79	1.13	1.47	-1.20	-.25
WEST SYSTEM													
1986 ACT.	842	811	746	715	704	682	679	684	692	736	789	802	
EST.	843	823	759	730	696	705	682	700	716	743	800	835	
	-.12	-1.46	-1.71	-2.05	1.15	-3.26	-.44	-2.29	-3.35	-.94	-1.37	-3.95	-1.65
ALL SYSTEM													
1986 ACT.	15964	15959	14604	13156	12422	12248	12617	12422	12672	13199	14734	15314	
EST.	15968	15481	14674	13396	12446	12557	12468	12900	12792	13068	14543	15524	
	-.03	3.09	-.48	-1.79	-.19	-2.46	1.20	-3.71	-.94	1.00	1.31	-1.35	-.33

COMPARISON OF ACTUAL AND ESTIMATED CUSTOMERS LOADS BASED ON THE 1986 LOAD FORECAST

TOTAL SYSTEM

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVERAGE
MUNIC	PEAK	MW											
1985	13465.	12929.	12790.	11692.	10707.	10520.	11425.	11588.	11903.	11165.	12679.	13862.	12060.
1986	14024.	13355.	13140.	11640.	11868.	11648.	12366.	11896.	11420.	11474.	13059.	13993.	12490.
% GR.	4.15	3.30	2.73	-.45	10.84	10.72	8.24	2.66	-4.06	2.77	2.99	.94	3.56
FCST	13979.	13314.	12813.	11886.	11209.	12060.	12193.	12189.	12114.	11490.	12980.	13963.	12516.
% DEV	.32	.31	2.55	-2.07	5.88	-3.42	1.42	-2.40	-5.74	-.14	.60	.22	-.21
	ENERGY	AV MW											
1985	10110.	9874.	9098.	8355.	7771.	7736.	8071.	8056.	8175.	8195.	9246.	9968.	8716.
1986	10413.	10428.	9495.	8653.	8155.	8187.	8630.	8236.	8291.	8569.	9589.	10013.	9048.
% GR.	3.00	5.62	4.37	3.56	4.94	5.83	6.92	2.22	1.42	4.57	3.71	.46	3.81
FCST	10438.	10110.	9622.	8693.	8147.	8382.	8429.	8630.	8439.	8474.	9491.	10025.	9068.
% DEV	-.24	3.15	-1.32	-.46	.10	-2.32	2.38	-4.57	-1.76	1.12	1.03	-.12	-.23
RETAIL	PEAK	MW											
1985	3464.	3300.	3262.	2736.	2248.	2052.	2040.	2104.	2230.	2609.	2996.	3688.	2728.
1986	3734.	3446.	3465.	2694.	2532.	2160.	2135.	2185.	2329.	2695.	3246.	3602.	2852.
% GR.	7.77	4.41	6.23	-1.53	12.60	5.30	4.63	3.84	4.45	3.32	8.32	-2.35	4.56
FCST	3670.	3446.	3185.	2835.	2468.	2225.	2193.	2282.	2371.	2711.	3105.	3736.	2852.
% DEV	1.75	-.02	8.80	-4.99	2.56	-2.89	-2.65	-4.24	-1.75	-.57	4.54	-3.59	-.01
	ENERGY	AV MW											
1985	2437.	2324.	2024.	1686.	1388.	1332.	1350.	1397.	1416.	1567.	1977.	2476.	1779.
1986	2535.	2476.	2149.	1699.	1466.	1398.	1435.	1450.	1496.	1690.	2114.	2399.	1856.
% GR.	4.02	6.54	6.18	.73	5.61	4.94	6.30	3.85	5.66	7.84	6.95	-3.09	4.34
FCST	2514.	2350.	2107.	1820.	1517.	1438.	1431.	1492.	1500.	1665.	2014.	2450.	1856.
% DEV	.81	5.34	1.97	-6.67	-3.34	-2.83	.31	-2.80	-.24	1.50	4.96	-2.06	-.01
DIRECT	PEAK	MW											
1985	2681.	2694.	2790.	2797.	2772.	2723.	2632.	2722.	2845.	2820.	2911.	2903.	2774.
1986	2865.	2876.	2859.	2789.	2769.	2770.	2628.	2781.	2878.	2930.	2966.	2965.	2840.
% GR.	6.83	6.75	2.46	-.31	-.11	1.74	-.15	2.13	1.18	3.89	1.89	2.11	2.35
FCST	2818.	2814.	2825.	2833.	2762.	2742.	2764.	2773.	2887.	2937.	2959.	2959.	2839.
% DEV	1.65	2.21	1.21	-1.55	.25	1.05	-4.90	.27	-.31	-.24	.21	.19	.01
	ENERGY	AV MW											
1985	2197.	2222.	2274.	2206.	2170.	2198.	1940.	2150.	2245.	2274.	2343.	2232.	2204.
1986	2323.	2347.	2325.	2295.	2237.	2137.	2039.	2152.	2279.	2367.	2380.	2253.	2260.
% GR.	5.74	5.64	2.22	4.07	3.07	-2.78	5.11	.09	1.52	4.05	1.59	.98	2.58
FCST	2310.	2336.	2309.	2309.	2225.	2202.	2015.	2198.	2278.	2372.	2424.	2348.	2276.
% DEV	.55	.47	.70	-.61	.54	-2.99	1.23	-2.09	.05	-.24	-1.79	-4.03	-.71
TOTAL	PEAK	MW											
1985	19611.	18923.	18843.	17225.	15727.	15295.	16097.	16414.	16977.	16594.	18587.	20454.	17562.
1986	20622.	19677.	19464.	17122.	17168.	16579.	17129.	16861.	16627.	17099.	19270.	20559.	18181.
% GR.	5.16	3.98	3.30	-.60	9.16	8.39	6.41	2.73	-2.06	3.04	3.68	.52	3.53
FCST	20466.	19574.	18823.	17554.	16439.	17026.	17150.	17244.	17372.	17137.	19045.	20658.	18207.
% DEV	.76	.52	3.40	-2.46	4.44	-2.63	-.12	-2.22	-4.29	-.22	1.18	-.48	-.14
	ENERGY	AV MW											
1985	14744.	14420.	13396.	12247.	11330.	11265.	11361.	11603.	11837.	12036.	13566.	14675.	12698.
1986	15271.	15251.	13969.	12646.	11859.	11721.	12104.	11838.	12067.	12625.	14083.	14666.	13164.
% GR.	3.58	5.77	4.28	3.26	4.67	4.05	6.54	2.02	1.94	4.90	3.81	-.06	3.67
FCST	15263.	14796.	14039.	12822.	11889.	12022.	11874.	12320.	12218.	12511.	13929.	14823.	13201.
% DEV	.06	3.08	-.49	-1.37	-.26	-2.51	1.94	-3.91	-1.23	.91	1.11	-1.06	-.28

COMPARISON OF ACTUAL AND ESTIMATED CUSTOMERS LOADS BASED ON THE 1986 LOAD FORECAST

EAST SYSTEM

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVERAGE
MUNIC	PEAK	MW											
1985	13167.	12630.	12539.	11468.	10499.	10324.	11235.	11401.	11688.	10944.	12385.	13544.	11819.
1986	13719.	13075.	12862.	11411.	11646.	11451.	12171.	11702.	11219.	11244.	12777.	13689.	12247.
% GR.	4.19	3.52	2.57	-.50	10.92	10.92	8.33	2.64	-4.01	2.75	3.16	1.07	3.62
FCST	13671.	13014.	12548.	11650.	10988.	11854.	11991.	11986.	11895.	11256.	12703.	13646.	12267.
% DEV	.35	.47	2.50	-2.06	5.98	-3.40	1.50	-2.37	-5.68	-.11	.58	.32	-.16
	ENERGY	AV MW											
1985	9888.	9664.	8928.	8196.	7625.	7596.	7939.	7931.	8036.	8033.	9043.	9736.	8546.
1986	10196.	10221.	9314.	8490.	8006.	8047.	8493.	8104.	8158.	8406.	9385.	9803.	8878.
% GR.	3.12	5.77	4.32	3.58	5.00	5.95	6.98	2.18	1.51	4.64	3.78	.68	3.89
FCST	10217.	9903.	9440.	8530.	7991.	8233.	8287.	8489.	8291.	8308.	9295.	9796.	8893.
% DEV	-.20	3.21	-1.33	-.47	.19	-2.25	2.49	-4.53	-1.60	1.18	.97	.07	-.17
RETAIL	PEAK	MW											
1985	3293.	3133.	3120.	2611.	2133.	1935.	1933.	1995.	2104.	2474.	2826.	3504.	2588.
1986	3546.	3269.	3300.	2563.	2402.	2049.	2030.	2079.	2213.	2557.	3081.	3428.	2710.
% GR.	7.71	4.36	5.76	-1.84	12.65	5.88	5.00	4.21	5.18	3.34	9.03	-2.15	4.69
FCST	3486.	3273.	3028.	2700.	2338.	2107.	2086.	2170.	2243.	2571.	2941.	3545.	2707.
% DEV	1.74	-.11	8.97	-5.07	2.74	-2.72	-2.63	-4.19	-1.37	-.57	4.78	-3.28	.09
	ENERGY	AV MW											
1985	2313.	2204.	1928.	1604.	1314.	1258.	1281.	1325.	1340.	1479.	1864.	2344.	1686.
1986	2413.	2356.	2042.	1609.	1389.	1327.	1366.	1380.	1419.	1603.	2000.	2279.	1762.
% GR.	4.31	6.89	5.88	.34	5.73	5.45	6.60	4.15	5.91	8.36	7.29	-2.78	4.55
FCST	2382.	2230.	1999.	1733.	1436.	1364.	1360.	1420.	1421.	1576.	1904.	2315.	1760.
% DEV	1.29	5.64	2.11	-7.11	-3.28	-2.71	.38	-2.78	-.16	1.72	5.06	-1.59	.15
DIRECT	PEAK	MW											
1985	2188.	2199.	2285.	2298.	2263.	2226.	2128.	2244.	2324.	2285.	2371.	2375.	2266.
1986	2346.	2358.	2347.	2286.	2257.	2254.	2119.	2265.	2364.	2416.	2449.	2453.	2326.
% GR.	7.25	7.24	2.74	-.53	-.28	1.22	-.43	.93	1.68	5.71	3.29	3.26	2.67
FCST	2304.	2299.	2313.	2331.	2262.	2238.	2257.	2266.	2379.	2431.	2452.	2452.	2332.
% DEV	1.83	2.58	1.47	-1.94	-.22	.70	-6.15	-.04	-.66	-.61	-.15	.05	-.26
	ENERGY	AV MW											
1985	1775.	1797.	1826.	1777.	1744.	1770.	1543.	1744.	1832.	1817.	1875.	1803.	1775.
1986	1884.	1896.	1897.	1865.	1793.	1694.	1598.	1706.	1838.	1910.	1935.	1825.	1819.
% GR.	6.16	5.54	3.85	4.94	2.78	-4.31	3.61	-2.17	.33	5.11	3.18	1.21	2.51
FCST	1872.	1879.	1881.	1871.	1799.	1758.	1581.	1754.	1837.	1929.	1968.	1923.	1837.
% DEV	.66	.91	.85	-.31	-.35	-3.67	1.07	-2.76	.05	-1.00	-1.67	-5.10	-.97
TOTAL	PEAK	MW											
1985	18647.	17962.	17944.	16378.	14895.	14486.	15296.	15641.	16116.	15703.	17582.	19423.	16673.
1986	19611.	18703.	18509.	16260.	16305.	15754.	16319.	16046.	15796.	16217.	18307.	19570.	17283.
% GR.	5.17	4.13	3.15	-.72	9.46	8.75	6.69	2.59	-1.99	3.27	4.12	.75	3.66
FCST	19461.	18585.	17889.	16682.	15588.	16199.	16334.	16423.	16518.	16258.	18096.	19642.	17306.
% DEV	.77	.63	3.46	-2.53	4.60	-2.75	-.09	-2.29	-4.37	-.26	1.16	-.37	-.13
	ENERGY	AV MW											
1985	13976.	13664.	12683.	11577.	10683.	10624.	10763.	11000.	11208.	11330.	12783.	13883.	12006.
1986	14493.	14473.	13252.	11964.	11188.	11068.	11457.	11190.	11415.	11919.	13320.	13906.	12460.
% GR.	3.70	5.92	4.49	3.34	4.73	4.18	6.45	1.73	1.84	5.20	4.20	.17	3.78
FCST	14470.	14012.	13320.	12133.	11226.	11354.	11228.	11662.	11549.	11813.	13167.	14034.	12490.
% DEV	.16	3.29	-.51	-1.39	-.34	-2.53	2.04	-4.05	-1.16	.89	1.16	-.91	-.24

COMPARISON OF ACTUAL AND ESTIMATED CUSTOMERS LOADS BASED ON THE 1986 LOAD FORECAST

WEST SYSTEM

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVERAGE
MUNIC	PEAK	MW											
1985	298.	299.	251.	224.	208.	196.	190.	186.	215.	221.	294.	318.	242.
1986	306.	280.	278.	229.	222.	197.	195.	194.	200.	230.	282.	304.	243.
% GR.	2.40	-6.25	10.79	2.24	6.94	.38	2.86	4.35	-6.69	3.79	-4.32	-4.29	.59
FCST	308.	301.	266.	235.	221.	206.	202.	202.	219.	233.	277.	317.	249.
% DEV	-.86	-6.86	4.67	-2.91	.64	-4.16	-3.30	-3.93	-8.71	-1.47	1.68	-4.10	-2.35
	ENERGY	AV MW											
1985	222.	210.	170.	158.	146.	140.	132.	126.	139.	161.	203.	232.	170.
1986	217.	207.	181.	163.	149.	140.	137.	132.	133.	163.	204.	211.	169.
% GR.	-2.18	-1.31	6.67	2.67	1.80	-.16	3.63	4.90	-4.09	1.00	.64	-9.08	-.11
FCST	221.	207.	183.	163.	157.	149.	142.	141.	149.	166.	196.	229.	175.
% DEV	-2.01	.18	-.84	-.36	-4.87	-6.28	-4.17	-6.67	-10.34	-1.85	3.93	-8.17	-3.27
RETAIL	PEAK	MW											
1985	172.	168.	143.	125.	116.	116.	107.	109.	127.	135.	170.	185.	139.
1986	187.	177.	166.	131.	129.	111.	105.	105.	117.	139.	165.	173.	142.
% GR.	9.03	5.33	16.39	4.85	11.80	-4.38	-1.93	-3.05	-7.78	3.02	-3.39	-6.05	2.05
FCST	184.	174.	157.	135.	130.	118.	107.	111.	128.	139.	164.	191.	145.
% DEV	1.94	1.70	5.47	-3.41	-.64	-5.90	-1.97	-5.22	-8.43	-.44	.27	-9.22	-1.94
	ENERGY	AV MW											
1985	124.	120.	96.	82.	75.	74.	69.	72.	76.	88.	112.	132.	93.
1986	122.	120.	107.	89.	77.	71.	69.	70.	77.	87.	114.	120.	94.
% GR.	-1.51	.07	12.18	8.23	3.65	-3.74	.70	-1.75	1.37	-1.03	1.24	-8.67	.52
FCST	132.	120.	108.	87.	81.	75.	70.	73.	78.	89.	110.	134.	96.
% DEV	-7.94	-.13	-.53	2.21	-4.48	-5.12	-1.06	-3.02	-1.79	-2.39	3.23	-10.27	-2.95
DIRECT	PEAK	MW											
1985	493.	495.	505.	499.	509.	497.	505.	478.	520.	535.	540.	528.	509.
1986	518.	518.	512.	502.	512.	517.	510.	515.	515.	514.	517.	512.	513.
% GR.	4.99	4.57	1.22	.72	.62	4.06	1.04	7.77	-1.07	-3.90	-4.25	-3.06	.94
FCST	514.	515.	511.	501.	500.	504.	506.	507.	508.	506.	507.	507.	507.
% DEV	.83	.55	.02	.25	2.38	2.61	.66	1.63	1.36	1.54	1.92	.90	1.22
	ENERGY	AV MW											
1985	422.	425.	448.	429.	426.	428.	398.	406.	414.	458.	467.	429.	429.
1986	439.	451.	428.	430.	444.	443.	441.	446.	442.	457.	445.	429.	441.
% GR.	3.98	6.09	-4.43	.44	4.24	3.54	10.95	9.82	6.79	-.13	-4.81	.00	2.83
FCST	439.	457.	428.	439.	426.	444.	433.	444.	442.	443.	456.	425.	439.
% DEV	.09	-1.34	.04	-1.86	4.29	-.29	1.84	.54	.04	3.07	-2.30	.80	.42
TOTAL	PEAK	MW											
1985	964.	962.	899.	847.	832.	809.	801.	773.	861.	891.	1005.	1030.	890.
1986	1011.	974.	955.	862.	863.	825.	810.	815.	832.	882.	963.	989.	899.
% GR.	4.91	1.34	6.30	1.73	3.75	1.95	1.07	5.43	-3.46	-.94	-4.13	-3.97	1.02
FCST	1006.	989.	934.	872.	851.	828.	815.	821.	854.	878.	948.	1015.	901.
% DEV	.52	-1.50	2.26	-1.17	1.47	-.29	-.67	-.67	-2.69	.43	1.57	-2.56	-.28
	ENERGY	AV MW											
1985	768.	755.	713.	669.	647.	641.	598.	603.	629.	707.	783.	792.	692.
1986	778.	778.	717.	682.	670.	653.	647.	648.	652.	707.	763.	760.	704.
% GR.	1.32	3.08	.44	1.93	3.62	1.89	8.16	7.42	3.73	.01	-2.53	-4.10	1.80
FCST	792.	784.	719.	689.	663.	668.	646.	657.	669.	698.	762.	789.	711.
% DEV	-1.83	-.75	-.27	-.99	1.06	-2.17	.20	-1.40	-2.48	1.21	.10	-3.69	-.95

LISTING OF FORECAST PEAK % ERROR BY CLASS AND REGION
BASED ON THE 1986 LOAD FORECAST
FOR THE PERIOD FROM JAN 1986 TO DEC 1986
% ERROR=(ACTUAL-FORECAST)/FORECAST*100.0

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVER PEAK
MUNIC													
CENT.	.11	.28	1.87	-1.48	8.19	-3.63	1.83	-1.88	-6.65	-1.00	-.25	.63	-.20
WEST.	-1.19	.33	2.60	-2.70	3.60	-3.49	1.25	-3.25	-4.76	.57	.75	-1.32	-.68
EAST.	.90	1.17	3.77	-4.83	.30	-2.93	.96	-4.05	-4.18	3.25	3.16	1.87	.14
GEOG.	4.39	2.14	6.16	-2.05	-.71	-2.18	-1.62	-3.29	1.33	.15	3.57	-1.37	.79
N.E.	7.16	.09	5.58	.94	2.04	.61	.44	.26	-1.77	2.57	3.67	-1.48	1.87
N.W.	-.86	-6.86	4.67	-2.91	.64	-4.16	-3.30	-3.93	-8.71	-1.47	1.68	-4.10	-2.35
EAST SYSTEM	.35	.47	2.50	-2.06	5.98	-3.40	1.50	-2.37	-5.68	-.11	.58	.32	-.16
ALL SYSTEMS	.32	.31	2.55	-2.07	5.88	-3.42	1.42	-2.40	-5.74	-.14	.60	.22	-.21
DIRECT													
CENT.	-.66	-1.11	1.54	.26	19.82	17.53	15.96	28.96	-29.80	11.47	2.74	11.24	4.78
WEST.	5.87	6.98	.74	.62	4.16	5.62	1.33	-.83	8.56	4.08	5.87	6.36	4.10
EAST.	-1.31	-.75	.46	1.47	-3.88	-2.21	-.05	-.95	-3.54	-3.43	.53	-2.75	-1.39
GEOG.	-4.84	-5.74	-4.72	-6.83	.13	-1.80	-31.85	-11.69	-10.36	-11.75	-9.95	-10.63	-10.01
N.E.	.02	.74	3.11	-5.50	-6.01	-5.70	-16.30	-.57	-2.52	-5.49	-5.93	-6.02	-4.09
N.W.	.83	.56	.02	.25	2.38	2.61	.66	1.63	1.36	1.54	1.92	.90	1.22
EAST SYSTEM	1.83	2.58	1.47	-1.94	-.22	.70	-6.15	-.04	-.66	-.61	-.15	.05	-.26
ALL SYSTEMS	1.65	2.21	1.21	-1.55	.25	1.05	-4.90	.27	-.31	-.24	.21	.19	.01
AREAS													
CENT.	2.99	.04	12.63	-4.04	3.72	-1.85	-2.57	-4.35	3.43	-.23	7.28	-1.34	1.63
WEST.	1.45	.19	6.71	-1.60	3.38	-5.99	2.11	-6.72	-5.02	-.26	4.39	-7.98	-.81
EAST.	1.15	.93	11.91	-6.94	.10	-.33	-4.25	-5.71	.27	.87	3.29	1.79	.70
GEOG.	.35	-1.73	8.48	-9.22	2.02	-3.47	-7.02	-1.59	-1.12	-1.84	7.59	-4.25	-.73
N.E.	3.50	-.32	3.41	-2.94	6.19	-1.15	-2.50	.01	-3.86	-2.16	1.36	-6.52	-.39
N.W.	1.94	1.70	5.47	-3.41	-.64	-5.90	-1.97	-5.22	-8.43	-.44	.27	-9.22	-1.94
EAST SYSTEM	1.74	-.11	8.97	-5.07	2.74	-2.72	-2.69	-4.19	-1.37	-.57	4.78	-3.28	.09
ALL SYSTEMS	1.75	-.02	8.80	-4.99	2.56	-2.89	-2.65	-4.24	-1.75	-.57	4.54	-3.59	-.01
TOTAL													
CENT.	.30	.25	2.57	-1.61	8.09	-3.29	1.81	-1.65	-6.66	-.68	.27	.70	-.02
WEST.	.85	1.85	2.86	-1.68	3.72	-1.51	1.39	-3.16	-1.45	1.37	2.62	-.83	.48
EAST.	.75	.88	5.78	-4.60	-.37	-2.19	-.46	-4.00	-2.95	1.62	2.88	1.35	.10
GEOG.	1.67	-.40	6.49	-5.89	.71	-2.76	-7.61	-3.50	-1.14	-2.03	4.25	-3.55	-.88
N.E.	2.45	.32	3.66	-3.73	-1.75	-3.65	-10.62	-.30	-2.71	-3.34	-2.20	-5.23	-2.08
N.W.	.52	-1.50	2.26	-1.17	1.47	-.29	-.67	-.67	-2.69	.43	1.57	-2.56	-.28
EAST SYSTEM	.77	.63	3.46	-2.53	4.60	-2.75	-.09	-2.29	-4.37	-.26	1.16	-.37	-.01
ALL SYSTEMS	.76	.52	3.40	-2.46	4.44	-2.63	-.12	-2.22	-4.29	-.22	1.18	-.48	-.01

LISTING OF FORECAST ENERGY % ERROR BY CLASS AND REGION
BASED ON THE 1986 LOAD FORECAST
FOR THE PERIOD FROM JAN 1986 TO DEC 1986
% ERROR=(ACTUAL-FORECAST)/FORECAST*100.0

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MUNIC													
CENT.	-.50	2.95	-1.87	-.01	.56	-2.65	3.16	-4.36	-2.20	.73	.45	.12	-.30
WEST.	-1.25	1.28	-1.25	-.73	-1.46	-1.44	1.11	-6.58	-.83	.39	-.49	.03	-.94
EAST.	1.06	5.78	.31	-2.69	1.15	-1.92	-.03	-3.77	-1.02	3.80	4.27	.87	.80
GEOG.	2.76	6.93	1.65	-.95	-1.14	-1.29	4.57	-1.95	2.25	2.28	4.20	.49	1.79
N.E.	3.58	4.97	-.31	.36	-.27	.67	3.66	.92	2.05	5.90	4.63	-5.06	1.62
N.W.	-2.01	.18	-.84	-.36	-4.87	-6.28	-4.17	-6.67	-10.34	-1.85	3.93	-8.17	-3.27
EAST SYSTEM	-.20	3.21	-1.33	-.47	.19	-2.25	2.49	-4.53	-1.60	1.18	.97	.07	-.17
ALL SYSTEMS	-.24	3.15	-1.32	-.46	.10	-2.32	2.38	-4.57	-1.76	1.12	1.03	-.12	-.23
DIRECT													
CENT.	6.95	7.05	20.24	-6.45	31.27	44.84	26.69	43.90	-39.62	3.24	-5.11	-5.58	4.06
WEST.	1.19	.89	.21	2.81	4.72	3.90	4.60	.99	9.98	2.02	2.82	-1.14	2.72
EAST.	-.78	-1.63	.81	1.88	-4.90	-.54	5.85	-2.24	-1.81	1.64	4.61	-1.88	.03
GEOG.	1.53	.29	2.40	7.58	-.28	.72	-39.56	-11.82	-9.33	-7.40	-7.87	-10.33	-7.26
N.E.	.04	1.29	-.27	-4.14	-7.01	-17.65	-.99	-9.11	-1.92	-4.81	-6.86	-9.24	-4.98
N.W.	.09	-1.34	.04	-1.86	4.29	-.29	1.84	.54	.04	3.07	-2.30	.80	.42
EAST SYSTEM	.66	.91	.85	-.31	-.35	-3.67	1.07	-2.76	.05	-1.00	-1.67	-5.10	-.97
ALL SYSTEMS	.55	.47	.70	-.61	.54	-2.99	1.23	-2.09	.05	-.24	-1.79	-4.03	-.71
AREAS													
CENT.	1.20	7.08	4.37	-7.19	-6.63	-1.85	-.68	-1.86	3.80	3.10	7.09	-.33	1.00
WEST.	.85	3.31	1.11	-6.13	.77	-6.40	3.72	-6.60	-4.50	-2.23	2.94	-3.62	-1.31
EAST.	1.89	7.48	3.86	-8.20	-4.05	-2.02	-.74	-2.77	2.49	3.55	4.31	.90	.94
GEOG.	.97	7.31	3.30	-8.10	-5.79	-1.25	-.83	2.21	2.07	5.47	10.09	2.11	1.81
N.E.	1.46	2.08	-3.18	-5.60	-1.24	.27	-1.02	-2.68	-3.46	-.59	1.20	-8.52	-1.85
N.W.	-7.94	-.13	-.53	2.21	-4.48	-5.12	-1.06	-3.02	-1.79	-2.39	3.23	-10.27	-2.95
EAST SYSTEM	1.29	5.64	2.11	-7.11	-3.28	-2.71	.38	-2.78	-.16	1.72	5.06	-1.59	.15
ALL SYSTEMS	.81	5.34	1.97	-6.67	-3.34	-2.83	.31	-2.80	-.24	1.50	4.96	-2.06	-.01
TOTAL													
CENT.	-.33	3.24	-1.30	-.49	.56	-2.18	3.16	-3.89	-2.65	.89	.69	.00	-.18
WEST.	-.30	1.52	-.49	-.57	.70	-.59	2.44	-4.51	1.57	.46	.94	-.92	-.01
EAST.	1.09	5.35	1.32	-3.44	-1.11	-1.71	.68	-3.30	-.36	3.39	4.32	.56	.73
GEOG.	1.77	6.54	2.49	-3.34	-3.16	-1.09	-4.23	-1.62	.46	2.34	5.43	.21	.82
N.E.	1.08	2.17	-.98	-3.74	-4.80	-11.40	-.21	-6.37	-1.62	-2.27	-2.98	-8.24	-3.15
N.W.	-1.83	-.75	-.27	-.99	1.06	-2.17	.20	-1.40	-2.48	1.21	.10	-3.69	-.95
EAST SYSTEM	.16	3.29	-.51	-1.39	-.34	-2.53	2.04	-4.05	-1.16	.89	1.16	-.91	-.12
ALL SYSTEMS	.06	3.08	-.49	-1.37	-.26	-2.51	1.94	-3.91	-1.23	.91	1.11	-1.06	-.13

COMPARISON OF 1986 ACTUAL AND 1986 FORECAST OF CUSTOMERS LOADS

	DECEMBER PEAK-MW			AVERAGE PEAK-MW			ANNUAL ENERGY-AV MW		
	ACTUAL	FOR*	FOR**	ACTUAL	FOR*	FOR**	ACTUAL	FOR*	FOR**
MUNICIPAL									
CENTRAL	8668.3	8612.8	8613.8	7892.7	7899.5	7908.6	5788.1	5798.9	5805.4
WESTERN	2311.4	2331.2	2342.2	2163.4	2160.1	2178.1	1541.1	1542.9	1555.7
EASTERN	1780.3	1747.6	1747.6	1442.7	1449.1	1440.7	1026.3	1023.9	1018.1
GEORGIAN BAY	555.4	560.1	563.1	462.6	459.3	459.0	319.1	313.7	313.5
NORTHEASTERN	373.6	379.2	379.2	285.7	281.3	280.5	203.7	201.1	200.5
NORTHWESTERN	303.9	316.9	316.9	243.1	252.6	248.9	169.5	177.8	175.2
SUBTOTAL	13992.9	13947.8	13962.8	12490.2	12501.9	12515.8	9047.8	9058.2	9068.4
RETAIL									
CENTRAL	648.4	657.2	657.2	500.4	490.4	492.4	320.7	316.3	317.6
WESTERN	692.2	752.2	752.2	598.9	606.3	603.8	414.5	421.7	420.0
EASTERN	931.6	915.2	915.2	689.9	688.8	685.1	433.7	432.0	429.6
GEORGIAN BAY	657.6	685.8	686.8	523.4	524.4	527.3	332.3	324.7	326.4
NORTHEASTERN	498.6	533.4	533.4	397.2	398.7	398.7	261.1	266.0	266.0
NORTHWESTERN	173.4	191.0	191.0	142.1	144.9	144.9	93.5	96.4	96.4
SUBTOTAL	3601.8	3734.8	3735.8	2851.8	2853.5	2852.1	1855.8	1857.0	1856.0
DIRECT									
CENTRAL	199.5	200.8	179.3	136.2	160.2	130.0	80.5	94.6	77.4
WESTERN	964.2	953.9	906.6	951.9	962.0	914.4	750.9	763.2	731.0
EASTERN	311.5	325.5	320.3	309.2	319.9	313.5	240.3	244.8	240.2
GEORGIAN BAY	94.9	112.2	106.2	83.2	95.0	92.5	71.6	79.4	77.2
NORTHEASTERN	882.7	941.3	939.3	845.6	886.0	881.7	675.9	714.6	711.3
NORTHWESTERN	511.9	517.4	507.4	513.4	514.9	507.2	441.2	446.2	439.4
SUBTOTAL	2964.7	3051.0	2959.0	2839.5	2938.0	2839.3	2260.4	2342.6	2276.4
SYSTEM TOTAL	20559.3	20733.6	20657.5	18181.5	18293.4	18207.3	13164.0	13257.9	13200.8

* EXCLUDES UNALLOCATED
** INCLUDES UNALLOCATED

FORECAST ERROR IN PERCENT FOR 1986 BASED ON THE 1986 FORECAST

% ERROR=(ACTUAL-FORECAST)/FORECAST X 100

	DECEMBER PEAK		AVERAGE PEAK		ANNUAL ENERGY	
	FOR*	FOR**	FOR*	FOR**	FOR*	FOR**
MUNICIPAL						
CENTRAL	.6	.6	-.1	-.2	-.2	-.3
WESTERN	-.9	-1.3	.1	-.7	-.1	-.9
EASTERN	1.9	1.9	-.4	.1	.2	.8
GEORGIAN BAY	-.8	-1.4	.7	.8	1.7	1.8
NORTHEASTERN	-1.5	-1.5	1.6	1.9	1.3	1.6
NORTHWESTERN	-4.1	-4.1	-3.8	-2.4	-4.7	-3.3
SUBTOTAL	.3	.2	-.1	-.2	-.1	-.2
RETAIL						
CENTRAL	-1.3	-1.3	2.0	1.6	1.4	1.0
WESTERN	-8.0	-8.0	-1.2	-.8	-1.7	-1.3
EASTERN	1.8	1.8	.1	.7	.4	.9
GEORGIAN BAY	-4.1	-4.3	-.2	-.7	2.4	1.8
NORTHEASTERN	-6.5	-6.5	-.4	-.4	-1.9	-1.9
NORTHWESTERN	-9.2	-9.2	-1.9	-1.9	-2.9	-2.9
SUBTOTAL	-3.6	-3.6	-.1	-.0	-.1	.0
DIRECT						
CENTRAL	-.7	11.2	-15.0	4.8	-14.9	4.1
WESTERN	1.1	6.4	-1.0	4.1	-1.6	2.7
EASTERN	-4.3	-2.8	-3.3	-1.4	-1.8	.0
GEORGIAN BAY	-15.4	-10.6	-12.4	-10.0	-9.8	-7.3
NORTHEASTERN	-6.2	-6.0	-4.6	-4.1	-5.4	-5.0
NORTHWESTERN	-1.1	.9	-.3	1.2	-1.1	.4
SUBTOTAL	-2.8	.2	-3.4	.0	-3.5	-.7
SYSTEM TOTAL	-.8	-.5	-.6	-.1	-.7	-.3

* EXCLUDES UNALLOCATED
** INCLUDES UNALLOCATED

4.0 UNCERTAINTY IN THE LOAD FORECAST

Table A shows the forecast error made in the determination of the East System annual peak demand over the historical time period 1950-85. The forecast error is seen to be a convenient summary index of uncertainty in the load forecasts made for the future in the Corporation.

Forecast error may be caused by many factors. Some of these factors are: error in energy prices, economic growth, marketing efforts, government policy, and the rate and penetration of technological improvements. In addition to these unforeseen shifts in exogenous variables, errors also reflect differing methodologies used in preparing the forecast. By looking at the errors in Table A we attempt to quantify an uncertainty band around our forecast.

The forecast error $e_{t,k}$ is defined as the relative difference between a forecast made in year t for a year k time periods ahead ($f_{t,k}$) and the actual demand in year t+k (a_{t+k})

$$e_{t,k} = (f_{t,k} - a_{t+k})/a_{t+k}$$

The forecast error $e_{t,k}$ has two attributes: 1) it is always greater than or equal to -1 and 2) empirically it has been found to exhibit an underlying exponential behaviour. It is appropriate, therefore, to study the transformed variable $X_{t,k}$ given by

$$X_{t,k} = \text{Ln}\,(1+e_{t,k})$$

The transformed variable $X_{t,k}$ is characterized by a normal distribution about the value 0 with a variance σ^2.

The variance σ^2 is given by the following formula

$$\text{var}(X_{t,k}) = \sigma^2 = E\,[X_{t,k} - E[X_{t,k}]]^2 = \sum_{t=1}^{n} x^2_{t,k}\,/n$$

Where E[ ] = expectation value

$x_{t,k} = X_{t,k} - \overline{X}_{t,k}$ where $\overline{X}_{t,k}$ is the sample mean of the population.

n = number of observations of k year-ahead forecast errors.

Letting S_k^2 represent the variance estimated for a given population sample, it is assumed that $X_{t,1}$ has a mean growth rate g and a variance S_1^2. Therefore,

$X_{t,1} = g + u$

$X_{t,k} = kg + u'$

where $u \sim N(0, S_1^2)$ (normal distribution)

where $u' \sim N(0, kS_1^2)$ (normal distribution)

The k year-ahead variance for $X_{t,k}$ (S_k^2) is given by kS_1^2.

If the variance of $X_{t,k}$ were to show no growth then $S_k/\sqrt{K}$ would be a measure of the square root of the "within trend" mean squared error as well as the square root of the total mean squared error. However, the variance does exhibit growth and the following linear regression is used to explain this behaviour.

$$s_k / \sqrt{k} = \alpha + \beta K$$

The uncertainty limits around the forecast for k years ahead are generated by the above equation and the following formula:

$$\text{limits} = F_t \exp [\pm Z_{\alpha/2} * S_t]$$

$$\Pr \left\{ F_t \exp (Z_{\alpha/2} * S_t) \leq F_t \leq F_t \exp (-Z_{\alpha/2} * S_t) \right\} = 1 - \alpha$$

where, F_t = forecast for period t

$Z_{\alpha/2}$ = normal deviate at the $\alpha/2$ probability

Pr = probability

The distribution of the uncertainty bounds has a log-normal shape. There is therefore no possibility of negative values being encompassed by the uncertainty limits.

TABLE A

FORECAST ERROR (%)*
EAST SYSTEM DECEMBER PEAK

Year Forecast Made	Years after Forecast 1	2	3	4	5	6	7	8	9	10
1950	-5.6	-11.1	-14.7	-16.6	-18.1	-25.4				
1951	1.1	0.1	-0.4	-1.5	-9.3					
1952	2.2	5.0	6.1	-2.0	-4.1					
1953	2.3	4.0	-2.5	-3.9	-4.1	-6.6				
1954	-0.4	-5.2	-6.0	-5.2	-7.4					
1955	-3.0	-2.5	-1.5	-3.2	-6.7	-5.3				
1956	1.6	5.7	4.8	2.0	3.7	5.2				
1957	2.8	1.5	-0.9	3.4	6.3	6.6	6.2	6.7		
1958	-0.9	-2.2	2.1	4.1	3.8	1.4	1.4	-1.8	-4.7	-3.4
1959	0.1	2.8	6.1	6.4	4.1	4.5	0.6	-2.9	-2.0	-7.4
1960	2.6	5.3	6.0	3.2	3.6	0.4	-2.9	-1.6	-6.6	-6.2
1961	1.9	3.2	0.8	0.6	-3.0	-5.4	-3.7	-8.3	-7.8	-8.5
1962	1.0	-1.9	-1.6	-4.8	-7.5	-6.6	-10.6	-10.1	-10.7	-7.1
1963	-2.7	-2.3	-6.0	-8.6	-7.1	-11.6	-10.8	-11.3	-7.5	-10.7
1964	-1.6	-4.4	-6.5	-5.3	-9.4	-8.7	-9.4	-6.4	-4.4	-5.1
1965	-1.2	-3.7	-1.5	-5.9	-5.2	-5.8	-1.7	-5.1	-5.6	0.0
1966	-1.0	0.2	-5.9	-4.2	-4.8	-0.6	-4.0	-4.4	1.7	0.1
1967	1.2	-3.1	-2.0	-2.2	2.4	-0.8	-1.0	5.5	4.2	3.3
1968	-0.3	1.7	1.7	7.0	3.2	2.7	9.5	8.2	7.3	16.5
1969	0.9	1.9	7.0	5.2	5.6	13.0	11.3	10.3	19.8	27.4
1970	1.0	6.7	5.7	5.5	12.0	10.9	9.8	19.2	26.8	30.5
1971	6.2	3.4	3.6	10.1	9.0	8.0	17.3	24.8	28.4	33.1
1972	1.9	2.0	8.6	7.2	6.0	15.0	22.3	25.9	30.4	41.5
1973	0.4	7.9	7.5	6.5	15.6	22.9	26.5	31.1	42.2	50.0
1974	6.3	6.3	7.0	17.4	26.0	29.7	34.4	45.8	53.9	47.5
1975	1.1	1.8	12.2	21.0	24.3	28.4	39.2	46.7	40.5	56.3
1976	-1.9	8.0	15.9	19.0	23.0	33.0	40.0	34.0	48.9	40.2
1977	5.8	13.0	15.6	19.6	29.4	35.9	29.4	43.2	34.3	41.9
1978	4.7	6.0	8.4	16.0	20.7	14.1	25.2	16.5	21.9	**23.7**
1979	1.4	1.2	6.7	10.7	4.4	14.4	5.9	10.3	**11.4**	**13.2**
1980	1.2	6.8	10.7	4.0	12.2	2.5	5.3	**5.0**	**5.4**	**7.0**
1981	3.4	5.1	-2.5	5.0	-3.9	-1.2	**-1.4**	**-1.0**	**0.6**	**2.0**
1982	4.8	-2.9	4.8	-4.4	-1.8	-2.2	**-2.1**	**-0.9**	**0.1**	**1.0**
1983	-6.3	1.5	-7.5	-5.2	-6.2	-6.7	**-6.5**	**-6.5**	**-7.0**	**-6.8**
1984	4.8	-4.5	-3.0	-3.9	-4.3	-3.8	**-4.0**	**-3.2**	**-2.1**	**-1.1**
1985	-5.2	-3.8	-4.8	-5.4	-5.1	-4.7	**-4.5**	**-3.3**	**-1.9**	**-0.6**
1986**	0.8	-	-	-	-	-	-	-	-	-

* Difference between forecast made 1 to 10 years prior to year indicated divided by actual. A negative sign indicates forecast is too low.

**Figures in bold are predicted errors of previous forecast assuming actual = 861208. Positive figures indicate the percentage deviation of previous forecasts from the 1986 forecast.

5.0 GLOSSARY

5.1 Demand (versus Load)

Demand means the electrical output from the Corporation's generating resources together with outside purchases required to supply the load of the Corporation's customers. In this report demand refers to the level of demand at the generating stations, while load refers to the flow of electricity at the wholesale billing points. Each term refers to peak or energy as specified in context.

Power means an instantaneous time rate of delivery of energy. Peak refers to the power averaged over a short period during which time the load is at its maximum. Energy demand is the accumulation of power over time, which results in an amount of useful work (or heat, lighting etc.)

In this report energy is reported in units of terawatt-hours or else in average megawatts. To obtain average megawatts for a period of time, the megawatt-hour figure is divided by the number of hours in the period.

Annual and Winter Peak Demand

All peak demands shown in this report incorporate the effects of typical weather conditions associated with the monthly peak demands. Under these conditions the annual peak demand occurs in December and the winter peak normally occurs in January.

Primary Peak Demand

Primary Peak Demand is the total generated and purchased minus secondary sales.

Secondary sales is power provided at the convenience of Ontario Hydro on a non-contractual basis usually to interconnected utilities. This element is not forecast in this report.

Primary Demand in Terms of Generation

Primary Peak Demand is the sum of the customers' peak requirements (not necessarily coincident with the system peak) adjusted by an allowance for diversity and losses. This figure gives the primary peak demand at the level of the generating stations.

- Peak - The figures shown are those for the time of the maximum 1-hour or 20-minute peak demand.

  An allowance for the weather effect expected on the typical monthly peak day is incorporated into the Primary Peak Demand for each month. Diversity and losses are affected by extreme weather as well.

- Energy - Monthly energy demands shown in this report are expressed in terawatt hours and average megawatts, in order to give an immediate impression of load factor, and also to make successive monthly values

independent of differences arising solely from the varying lengths of the months.

Ontario Primary Demands in Terms of Generation

East System

Includes:

The primary power and energy loads of Municipalities, Industrial Customers, and Retail Customers in Ontario within the geographic boundaries of the Central, Western, Eastern, Georgian Bay and Northeastern Regions, together with appropriate diversity and losses.

Power and energy delivered free of charge by Ontario Hydro to Spruce Falls Power and Paper Company Limited in compensation for the effects of Little Long Generating Station on the Company's Smoky Falls Generating Station.

Excludes:

Power and energy exported to the United States and the Province of Quebec. Also excluded are deliveries under exchange agreements, namely, to Fort Erie on behalf of the CNP Company, and to Cornwall on behalf of the St Lawrence Power Company. In both of these cases the amount of power delivered is made up at another point on the system so that there is no resultant demand on the Corporation's resources.

The loads of retail customers in Hornepayne, although customers of the Northeastern Region, because they are supplied from power resources within the Northwestern Region.

West System

Includes:

The primary power and energy loads of Municipalities, Direct and Retail Customers in Ontario within the geographic boundaries of the Northwestern Region, and the loads of retail customers in Hornepayne together with appropriate diversity and losses. The latter customers are included because they are supplied from resources within the Northwestern Region.

Power and energy delivered free of charge to Boise Cascade Company (Kenora), as compensation for the effects of Whitedog Falls Generating Station on the output of its generating stations.

Excludes:

Power and energy exported by Ontario Hydro to the United States and the Province of Manitoba.

Power and energy delivered to Boise Cascade at Fort Frances in exchange for the output of the Company's Calm Lake and Sturgeon Falls Generating Stations.

Ontario primary demands (both East and West Systems) exclude the delivery of turbo replacement power to various paper companies.

5.1.1 Basic Load Forecast

The Basic Load Forecast shows what will happen to electricity demand if Ontario Hydro does not adopt new activities to affect electricity demand. However, the current Demand/Supply Options Study indicates some future electricity needs of the province may be met by other means than by increasing supply. Ontario Hydro could promote changes in the pattern of usage to allow some of the province's future electricity needs to be met by demand reductions.

5.1.2 Primary Load Forecast

The Primary Load Forecast takes into account the effect on Ontario Hydro demand of future Ontario Hydro activities designed to affect the level and shape of the load. It is derived by subtracting from the Basic Load Forecast the net effect of Ontario Hydro incentive programs:

(1) changes in rate structure such as time-of-use, off-peak incentives, etc;

(2) financial incentives such as grants or loans, etc.

These programs are called Ontario Hydro **Indirect Incentives.** It is the Primary Load Forecast which is to be used for supply planning purposes.

5.2 Diversity and Losses

Diversity is the difference between the sum of (individually metered) customer loads at the time of system peak and the arithmetic sum of the peak loads of all the customers regardless of whether they coincide with the system peak or not. Since individual customers experience their peak loads at diverse times, the arithmetic sum of their peak loads will be greater than the sum of customer loads at the time of system peak, and therefore the value for diversity is always negative.

Losses are the sum of electrical losses and consumption incurred in transmitting the electricity from the generating stations' terminals to all the customer metering points. This is evaluated by taking the difference between customer loads and system demands measured at the generating stations.

The figure for diversity and losses together will be positive if losses exceed diversity, and negative when diversity exceeds losses.

Diversity is a function of the timing of end-use utilization which is affected by social patterns and weather conditions. Losses are due mainly to transmission line loadings determined by system configuration and operation. System operation depends on hydraulic generation resources, export and circulating power flow, outages, etc.

There is no diversity in energy demand. The difference between the primary energy and the energy delivered to customers is losses.

5.3 Customers' Loads

Customers' Loads are the maximum peak loads of system customers which include cost contract municipalities, industrial customers and retail customers. Estimates of these loads are provided by the Regional Marketing Managers. The totals of these non-coincident customers' loads are referred to as the sums of customers' loads with appropriate qualifications for regional and other classifications.

The forecasts of Area loads in this report conform to the Power Billing Department, Customer Service Division practice of obtaining Area loads by summing the non-coincident loads of the D.S.'s supplying it.

5.3.1 Firm Loads

Firm Loads are supplied as required by the customer at all times as far as physical conditions permit.

5.3.2 Capacity Interruptible Loads

In general, capacity interruptible loads are those which can be interrupted under contract provisions which exchange interruptibility for the lower rates. Capacity interruptible power is the only class available. This class of power is available only for loads which can be reduced by at least 5,000 KW during interruption periods.

The sum of interruption periods shall not exceed the following:

(1) In any month up to 15% of the total time in the month.

(2) In any year up to 10% of the total time in the year.

(3) In any 5 consecutive years up to 5% of the total time in the 5 year period.

The purpose of supplying this class of power is to enable Ontario Hydro to reduce the generation reserves it would otherwise provide for, and to serve as a means of system relief under emergency conditions and other unpredictable circumstances.

Interruption Periods - (applicable Monday to Friday inclusive)

March to November inclusive - up to 5 hours per day
December, January and February - up to 14 hours per day

The customers' loads in this report are composed of the total firm and capacity interruptible. Therefore, in this report, the demands shown assume that rights of interruption under Capacity contracts are not exercised.

The amounts of power under contract within this class can therefore be regarded as being served out of reserve capacity planned for other purposes. No capacity is planned to meet interruptible loads.

As can be seen from the table under 1.2.4, 78 MW of capacity interruptible contracts are forecast to be added in the period of 1985-90. Due to the changing shape of the system duration curve and to diversity among these customers, the task of translating non-coincident interruptible loads into the potential capacity savings from primary load cuts requires that allowance be made for diminishing effectiveness of successive increments of interruptible contract.

5.4 Standby Power

The Corporation has undertaken to supply standby power to the following customers who have their own generation.

	Standby Amount	
Boise Cascade - Kenora	10.5	MW
Boise Cascade - Fort Frances	8.0	MW
Eddy Forest Industries Ltd	7.5	MW
Gananoque Elec Light & Water	1.25	MW
Great Lakes Forest Products (44 kV)	6.0	MW
Great Lakes Forest Products	17.1	MW
MacMillan Bloedel	1.8	MW

No specific allowance has been made for increases in the customers' load or system demands from standby requirements of customers.